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MONTANA

Resources and Opportunities Edition

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DIVISION OF PUBLICITY

A. H. Bowman
Commissioner

Barclay Craighead
Publicity Division

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AUGUST, 1928

HELENA MONTANA

THE MONTANA STATE CAPITOL, BUILT OF MONTANA STONE.

MONTANA'S STANDING AMONG THE STATES

Montana, ranking thirty-ninth among all states in population, rates much higher in many of the important factors tending to make life worth living.

The State places among the first in the health of her citizens, with one of the lowest death rates in the Union. Recreational resources are not excelled elsewhere and Montana is first in area of national parks and national forests, and in area of virgin farm lands.

In material possessions Montana ranks high, standing on January 1, 1928, in value of output: first, in the production of arsenic, manganese and precious stones, and second, in silver and spring wheat.

Montana ranks third in area, among all states: in coal resources, in percentage of home owners and in freedom from illiteracy, in numbers of sheep, in copper and all wheat production.

The State is fourth in area of irrigated lands, in wool, flax, cherries, zinc and durum wheat production, and in stumpage remaining on national forests.

Fifth, in total area of lands in farms.

Sixth, in lead, in edible bean production and wild hay.

Seventh, in potential water-power resources and in production of rye.

Eighth, in natural gas output, gold and sugar beets.

Tenth, in petroleum and barley.

Fourteenth, in all hay production, and in estimated wealth per capita.

Sixteenth, in oats and tame hay.

Eighteenth, in value of livestock production.

Nineteenth, in number of all cattle.

Twenty-second, in corn.

Twenty-third, in number of milk cattle.

Twenty-fifth, in lumber production.

Twenty-ninth, in potatoes.

Thirty-eighth, in apples.

And thirty-ninth, as rated above, in population. Surely such a State merits the investigation of the thoughtful prospective settler. This book, an official state publication, will attempt to supply the new citizen and investor with the primary essential facts about Montana.

8016

Kootenai River
St. Marks R.
Flathead R.
CONTINENTAL DIVIDE
Marias River
Milk River
Bear Paw Mts.
Cabinet Mts.
Coeur d'Alene Mts.
Clark Fork
Flathead Riv.
Kootenai Mts.
Mission Range
Sun River
Missouri River
Missouri River
Lewis & Clark Pass
Little Belt Mts.
Big Belt Mts.
Musselshell River
Yellowstone River
Deer Lodge Valley
Crazy Mts.
Three Forks
Bridger Mts.
Jefferson Riv.
Tobacco Root Mts.
Madison Mts.
Gallatin Mts.
Bozeman Pass
Gallatin Riv.
Absaroka Mts.
Beartooth Mts.
Pryor Mts.
Big Horn River
Little Big Horn River
Rosebud Mts.
Gibbon Pass
CONTINENTAL DIVIDE
Snow Crest Mts.
Gravelly Mts.

FOREWORD

The story of Montana which is here presented is designed to furnish readable facts for the thoughtful prospective citizen looking toward the State as a place of residence and for those who seek a field for profitable investment. Care has been taken to present in simple language only the truth.

The book is largely a re-print of a similar publication issued two years ago by the state division of publicity. That publication became something of a standard authority on Montana. It was used by the schools in this and other states as a textbook. That it filled a need is indicated by the fact that the supply was exhausted within less than six weeks after the date of publication. It is hoped that this edition will meet with equal favor.

Montana is the least finished of all the states; there probably are more opportunities for development work open to men of moderate means in this Treasure State than in any of the sister commonwealths. While an effort has been made to etch in strong lines the achievements of the past, space has not been spared in this publication to point out the possibilities of the future.

The reader will find the book broken into the following general subdivisions: History, Geography and Climate, Transportation, Recreational Areas, the People and Institutions, the Industries and the Counties. The aim has been to set forth information of practical value and to leave even the casual reader with a fairly complete bird's-eye picture of the State.

To the many who have cooperated in the task sincere thanks are offered; so numerous are they that the mention of names might, by unintentional omission, be unfair.

BARCLAY CRAIGHEAD,
Chief, Publicity Division,
Department of Agriculture, Labor and Industry.
Helena, Montana.

GOVERNOR ERICKSON'S STATEMENT

JOHN E. ERICKSON
Governor of Montana

Montana is a state of imperial domain. It is the third largest state in the union. Within its borders could be placed all of New England, and there would still be room enough for New York, New Jersey, Delaware and Maryland. It has more square miles than Ohio, Indiana and Illinois combined. One of the continental railway lines crossing the state has 767 miles of main line between its eastern and western boundary lines, and its fastest express train puts in 24 hours within our borders on its journey to the coast.

State of Scenic Beauty.

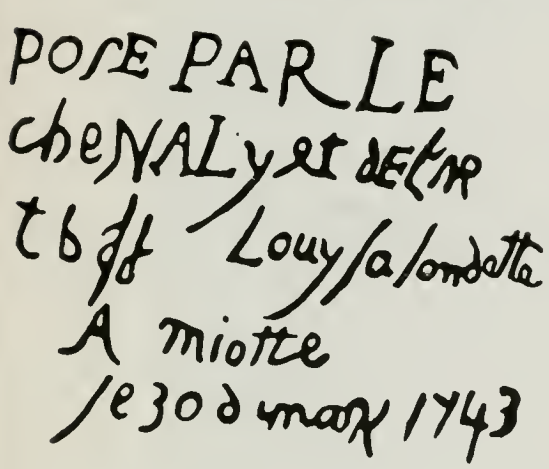
Montana is a state of scenic beauty. Tourists returning from abroad often complain of insults tossed at Americans in Europe, and one wonders why they should suffer and endure this when they could much more easily see America first, and thus make it unnecessary to see Europe at all, for we have in our country, and especially in Montana, scenery that cannot be surpassed for grandeur and impressiveness and beauty. This is the verdict of many who have traveled to all the beauty spots of the world. Two of the gateways to the Yellowstone national park, the nation's wonderland, are in Montana; while Glacier national park, with its innumerable mountain peaks and eternal snows, its crystal lakes and matchless mountain streams, is wholly within our state.

The people of Montana believe in their great state, in her mountains and her plains; in the richness and beauty of her lakes and her rivers; in her vast forests; the gorgeous beauty of her skies and the healthfulness of her climate. We believe in Montana people; in their patriotism, their faith and their ideals. We believe in Montana's glorious future. What we need is men, high-hearted men of intelligence and industry in search of opportunity. We have no place for the ne'er-do-well, the land hog or the speculator. Montana needs the settler and the homebuilder and the investor.

We have passed through the pioneering period. We know what we can do. With our 30,000,000 acres capable of cultivation, with the development of our power and our immense coal and iron deposits; the development of these vast resources will mean increased payrolls, home markets and diversified industries. In short it will mean a great, a wealthy, and a prosperous state. And a characteristically western, warm welcome awaits you whenever you want to come out to see us.—J. E. ERICKSON.

MONTANA'S ROMANTIC HISTORY

First White Men to Set Foot on Montana Soil—Jefferson Buys Montana from Napoleon—Early Development Slow.



THE VERENDRYE PLATE

Translation: "Placed by the Chevalier de La Verendrye, Louis Joseph (his brother) Louy La Londette, A. Miotte (two employees) the 30th of March, 1743."

On a crisp, sparkling New Year's day in 1743, a travel wearied little group of fur traders and explorers urged on their worn steeds in what is now Southeastern Montana. All day they pressed westward. As the sun hung low, silhouetting long shadowy forms at their backs, to the west they beheld a marvelous scene—.

A barrier of mountains lay across their road. Far off they had been blue, with a mantle of fog on top. Now they lay in tumbled masses, peak after peak banked high, one summit behind another and, hardly to be seen with the naked eye, more summits fainter in out ine and mysterious. As they came nearer, these majestic hills covered with snow and painted by a dying sun, changed in color to pink and green and grey and yellow.

The view brought to the lips of their leader the graphic metaphor, "This is the Land of Shining Mountains." For almost two centuries the expression has clung to Montana.

First White Men in Montana.

The leader of the party was Chevalier De La Verendrye, 35 years of age. Thus to the Verendrye brothers, Chevalier and Pierre, Frenchmen, hunters, fur traders explorers, belongs the honor of being the first white men to set foot on Montana soil.

These adventurers had a great object in view. They were seeking the Pacific ocean and were lured on by a tale often repeated by Indians of a great river which flowed from far up in the largest of all ranges of western mountains and of another river running in the opposite direction and leading to a great salt sea so vast that an Indian dare not venture far out in a canoe.

The Verendryes never reached the Pacific. When they set foot on Montana soil it was twelve years since the

PIERRE DE LA VERENDRYE
by E. S. Paxson.

LEWIS AND CLARK EXPEDITION MEETING WITH SHOSHONE INDIANS, AUGUST 22, 1805, AT TWO FORKS, NEAR ARMSTEAD, BEAVERHEAD COUNTY, MONTANA—By Charles Russell.

start of their journey at Montreal in 1731.

On the 29th of April, 1742, the party left the Canadian Lake of the Woods, where a fur trading post had been established. The journey of several thousand miles to southeastern Montana was achieved against terrific odds. On the return trip, May 2, 1743, Verendrye raised a monument on an eminence on the Missouri near what is now Pierre, South Dakota, and planted a leaden plate bearing the date and the arms of France.

SILENT SENTINELS AT CUSTER BATTLEFIELD

School Girl Finds Plate.

A hundred and fifty years later two children were returning to their home from school at Pierre, South Dakota, when one of them stubbed her toe against a protruding object. Feminine curiosity won! They dug, and found a curious piece of metal. It was the Verendrye plate, now the property of the South Dakota Historical Society, and reproduced on the preceding page by permission of the Society.

As a result of the exploration of Verendrye and others, Montana, in common with all the states of the Union included in the Louisiana purchase, was a province of France and became a pawn of the European powers.

At the beginning of the nineteenth century, Great Britain and France had long been at death grips for world empire. Clashing national ambitions, religious antagonisms, dynastic feuds, all played a part in bringing on and continuing the struggle. The battle royal was waged on land and sea, by statesmen and by warriors, by money and by arms.

In the struggle the impotent Bourbon rulers of France lost Montana to England; Napoleon determined to have it back. In 1800, as one of the first fruits of victory, he got it—with all of Louisiana—an imperial domain out of which fourteen of the best states of the Union have been carved.

In 1803, war between France and England again breaking out, Napoleon sold Montana, with the other states included in the Louisiana purchase, to the United States. The deal was consummated by the statesmanship of Thomas Jefferson. When Jefferson took office, the United States was hemmed in by the Mississippi and the Atlantic; by a sweep of the pen he flung our frontiers toward the sunset; he did not rest until the feet of his explorers had officially touched the western sea, for an expedition was at once set on foot to open up to the knowledge of the world the mysterious regions of the west.

Upon Jefferson's orders, Lewis and Clark, both fellow Virginians, starting from St. Louis crossed Montana in 1805, and made their way to where the Columbia River enters the Pacific. There were 34 men and one woman in the expedition. The woman was an Indian, Sacajawea by name. She was the chief guide. She knew the fords and passes; for two thousand miles she led the way, her babe

LEWIS AT BLACK EAGLE FALLS
by E. S. Paxson.

"CUSTER'S LAST STAND"—by E. S. Paxson.

upon her back and when hope sank in the hearts of the men she cheered them forward.

At a cost of $2,500, the work of these explorers not only acquired knowledge of the Louisiana purchase, but laid the foundation to the American claim to the Oregon country.

Save for Thomas Jefferson, Montana might today be a part of Canada or a province of France; when Jefferson laid down his duties, Montana was a part of "history's grandest realm devoted to democracy."

IN THE NEZ PERCE COUNTRY

One of the remarkable men among the traders and trappers met by Lewis and Clark on their historic journey was John Colter, the first to explore that singular region, the nation's wonderland, now known as Yellowstone park. A full description of the park will be found in the chapter of this volume entitled "Recreational Resources;" suffice to say that Colter's description, though reasonably accurate, was thought to be the ravings of an insane person when it filtered back to the eastern part of the country. Chittendale says, "No author or map-maker would jeopardize the success of his works by incorporating in it such incredible material as Colter furnished. His stories were not believed, their author became the subject of jest and ridicule, and the region of his adventures was long derisively known as 'Colter's Hell.'"

The Fur Traders.

For fifty years development was slow. According to the record of the Montana Historical Society, Manuel Lisa in the fall and winter of 1807-8, established at the junction of the Yellowstone and the Big Horn River the first fur trading post in Montana. Two years later in April, 1810, Lisa promoted a second post, the first of importance in interior Montana, located at Three Forks.

In 1829 Kenneth McKenzie established a post at the mouth of the Yellowstone River. In 1831 the same company established a trading post below Fort Benton, known as Fort McKenzie. The present city of Fort Benton was established and built in 1846, by Alexander Culbertson, for the American Fur Company. With the fur traders came missionaries and explorers; Montana became the battleground for competing English, French and American fur companies, noted only for the quality and number of skins sent out. Fabulous profits were made by some of the companies, permitting them to erect substantial buildings in which the traders lived the virtual rulers over areas larger than the whole of New England. They lived, "like a King in his Fort," as Palladino remarks.

GENERAL GEORGE A. CUSTER

Fort Union, just inside the

"THE SURRENDER OF CHIEF JOSEPH"—by E. S. Paxson.

Montana border, but three miles from the mouth of the Yellowstone was probably the most pretentious establishment. It was a palisaded fort, built 30 feet high with stone and pierced for cannon. Here the Factor reigned supreme over an empire as large as Europe. To this place came the Indians from all the northwest tribes, while the Factor "entertained from time to time many great scientists and men of letters, among them Maximilian, Prince of Wied, Catlin, English artist, Audubon, naturalist, and Father De Smet, who came to this region to study the aboriginal red man and the wild game that then swarmed over this region in countless thousands."

AN INDIAN GRAVE

These adventurous spirits who set up their lonely outposts and roamed the uncharted regions of Montana used the Missouri and her tributaries as an aid to transportation. Up its boiling course came canoes and bateaux, keel boats, scows and rafts, manned by traders and trappers. The head-reaches of the mighty river spoke of new and untried fields. The swift, gurgling current sang a seductive song to men of spirit and hastened the exploration of the state. Later, the miniature whirlpools and myriad eddies whispered invitingly to steamboat pilots and captains.

Discovery of Gold.

It was not until the discoveries of gold at Gold Creek, Bannack and Virginia City, 1858-65, that large numbers were attracted to Montana. Then this state began to play her destined part in what was probably the most momentous immigration movement in history, the settlement of the American west. The immigrants came partly as a back wash from California and the Pacific Coast; overland by ox team from the middle west; many came up the turbulent expanse of the Missouri. Then began the golden age of the Missouri.

Life on the Missouri.

Mark Twain, in the best of all his books, has immortalized "Life on the Mississippi." The glory of life on the upper Missouri during the gold rush to Montana remains to be written, for this steamboat era is among the most picturesque in the state's history.

HART STATUE TO "THE COWBOY" AT BILLINGS

While steamboats had been used around St. Louis since 1817, the first man to try the Missouri was Pierre Chouteau, fur trader. In 1832 he arrived at Fort Union. Nearly thirty years later, his son, Charles P. Chouteau, found that boats could go as far as Fort Benton. What a shock to the Indians, the Yellowstone, first steamboat to ascend the Missouri into Montana, must have been as she steamed into Fort Union at the majestic rate of two miles per hour!

Steamboat days began in earnest about 1859 and belong to part of the story of the prospectors. The boats all looked much larger than they were, because they rode almost wholly upon the surface of the water, drawing only three or four feet. The top deck, known as the Texas, was small and contained the officers' quarters. On top of this deck was the pilot's cabin, the supreme com-

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Helena - Montana

manding officer, outranking the captain of the vessel.

Navigation was difficult. "Navigation of the Mississippi was child's play compared to the Missouri," says one writer and one of the old papers of the period remarks, "Of all the variable things in creation, the most uncertain are, the action of a jury, the state of a woman's mind, and the condition of the Missouri river." Nevertheless the men of that day conquered all obstacles. The pot of gold at the end of the rainbow in Montana beckoned and they pulled their boats with ropes over the sandbars and through the rapids, worked their way around the fatal snags and whirlpools, braved the Indians and fought the cholera on board ship, forcing their way ever up the great artery of commerce to build cities, to take up homesteads and to mine gold.

The traffic attained tremendous proportions. In 1859, according to the newspaper advertisements at St. Louis more boats left bound for the upper Missouri than for both upper and lower Mississippi points. In 1867 ten thousand passengers were landed safely at Fort Benton.

History Makers.

A curious assortment were the passengers, history makers all. There were Indians returning from a mission to the Great Father at Washington, immigrants bound for the Oregon country, soldiers heading for the army posts, missionaries, Mormons on their way to Salt Lake, gold seekers starting the overland part of their journey to the newest "diggings," government agents and "gentlemen" of the period on hunting expeditions.

And Montana did not disappoint them. The year before one boat, the Levella, had brought down one and one-fourth millions in gold dust on a single trip. Profits were large. Prices were high. Another boat, the Peter Balen, cleared $65,000 in a single season. It was not unusual to pay for the boat in a season's work. The placers yielded up their treasure and it is estimated that Montana produced in gold and silver $211,000,000, previous to 1880.

Placer Miners.

The history of mining has been covered in another chapter of this volume. C. W. Towne, describing the early methods of mining says:

"In the old days, the miner for gold toiled with pick and pan or raised his ore from the bottom of a rude shaft by frequent shifts of his 'mud boxes.' At the surface, he dumped it into a 'Little Rocker' or a 'Georgia Bumper,' where the gold was separated from the gravel. If he had a 'Long Tom'—an inclined box with side-boards, cross bars and a screen of perforated sheet iron—he was numbered among the aristocrats."

Later great ditches, some 20 miles and more in length, were wound around the hills to carry water to immense hydraulics and sluice boxes six feet in width, capable of carrying several thousand tons of gravel each 24 hours. Then came the era of quartz mining and dredging.

Early Roads.

In 1853 the national congress appropriated $150,000, to be expended in survey work in an effort to find the best route to California. Washington, to the west of Montana, was made a territory the same year and the northern of five proposed routes to the Pacific lay through this State. In 1857, $30,000 was allowed for the building of the road, actual construction beginning in 1859. The work was entirely finished by August, 1863; a road 624 miles in length built at a final cost of $230,000. This Mullan road, taking its name from Lieut. John Mullan, after leaving Fort Benton, crossed the mountains near Helena, on the same pass now taken by the Northern Pacific railway. It passed Deer Lodge and Missoula and crossed the Bitter Root range to Idaho and Walla Walla, Washington. Built for the convenience of immigrants to Washington and Oregon, it aided in the development of Montana as well.

After gold was discovered in the state a road was built in 1862-64 by J. M. Bozeman from the Platte river to Virginia City, Montana.

Vigilante Days.

It was natural that the gold fields in Montana would draw the "tough" element from California and other more rapidly settled western states. The gold miners

of Montana were more than their match. "Bad men" who had terrorized entire communities in other states found they would not be tolerated here.

Vigilance committees were quickly formed and the leaders of the robbers hung with speedy justice, adding another brilliant page to Montana history. This phase of Treasure State history has been thoroughly covered; it represents a picturesque period in the winning of the west, possibly over emphasized.

The reader will find, for example, that Mark Twain, though he never visited this state previous to writing his "Roughing It," drew upon our history to make the story of California and Nevada interesting. After devoting 18 pages of his book to a desperado named Slade, who was executed in Montana, he quotes from the first book published in the state, "The Vigilantes of Montana" by Dimsdale, to illustrate the character of Slade as follows: "From Fort Kearney west, he was feared a great deal more than the Almighty."

"For compactness and simplicity and vigor of expression," writes old Mark, "I will back that sentence against anything in literature."

The Indian Fights.

In their battles with the white man the plains Indian generally made one fatal mistake. It was not due to lack of courage. It was due to training and to an experience gained in fighting with other Indians.

The tribesmen were splendid horsemen. They preferred to fight from horseback. They were courageous at the charge and did not waver under fire. But when only about twenty or thirty feet from the enemy they almost invariably, instead of riding through, swerved to right or left after one volley, later wheeling to continue the attack. The entrenched whites took full advantage of this method of attack, holding their fire to the last moment, with terrible effect. Hence it was that in relatively unimportant skirmishes with fur traders and immigrants, the whites were able to sell their lives dearly or to beat off an attack made by greatly superior numbers.

The fur traders to Montana were not numerous, and generally their business made it imperative that they remain on friendly terms with the Indians, so it was not until the arrival of the gold seekers and the flood of immigrants that followed that the important battles in this state were fought.

Both With Outside Indians.

It is of interest to note, however, that in both great Indian wars fought out in this state the hostiles were from outside our borders. The Nez Perces came from Idaho, and the Sioux, before whom brave Custer and all his command fell, from the Black Hills of South Dakota.

The Nez Perce War.

Chief Joseph, hereditary leader of the Nez Perce, was, according to Cyrus Townsend Brady, "a wonderful specimen of the Indian, standing six feet tall, straight as an arrow and wonderfully handsome." Most certainly he was a remarkable man and a great warrior, a veritable red Napoleon, skilled in the strategy of warfare. He led his tribe against United States troops eleven diffrequent times, fought five pitched battles, of which he won three; drew one, and lost one—all in single campaign. The total force opposing him numbered about 2,000 men.

According to Henry Buck, one of the party of Montana volunteers, Joseph had about 3,000 head of horses, not including the cattle. Early in the campaign the Indians were without food and supplemented their supplies by eating roots and the inner bark of pine trees.

But Joseph was more than a warrior. He represented the best of the Indian. He was a peace time advocate of the rights of his followers, logical in reasoning powers. In this volume we are letting him tell his own story, not that there is not another side to the tale but because the Indian's side is seldom related.

On his trip to Washington in 1897, Joseph first "opened his heart" to the reporters with a lofty bit of Nez Perce philosophy. He said:

"My friends, I have been asked to show you my heart, I am glad to have a chance to do so. I want the white people to understand my people. Some of you think an Indian is like a wild animal. This is a great mistake. I will tell you all about our people, and then you can judge whether an Indian is a man or not. I

believe much trouble and blood would be saved if we opened our hearts more. I will tell you in my way how the Indian sees things. The white man has more words to tell you how they look to him, but it does not require many words to speak the truth."

And again:

"Our fathers gave us many laws, which they had learned from their fathers. These laws were good. They told us to treat all men as they treated us; that we should never be the first to break a bargain; that it was a disgrace to tell a lie; that we should speak only the truth; that it was a shame for one man to take from another his wife, or his property, without paying for it. We were taught to believe that the Great Spirit sees and hears everything, and that He never forgets; that hereafter He will give every man a spirit-home according to his deserts; if he has been a good man, he will have a good home; if he has been a bad man, he will have a bad home. This I believe, and all my people believe the same."

Joseph then tells how long his people had lived upon their land and how much they loved the soil. He describes the arrival of the first Americans and claims that his tribe withdrew farther into the mountains to avoid conflict. Of the first meeting with soldiers and his father his account reads:

"He (Governor Stevens) said there were a great many white people in the country, and many more would come; that he wanted the land marked out so that the Indians and white people could be separated. If they were to live in peace it was necessary, he said, that the Indians should have a country set apart for them, and in that country they must stay. My father, who represented his band, refused to have anything to do with the council, because he wished to be a free man. He claimed that no man owned any part of the earth, and a man could not sell what was not his own. * * * *

"Soon after this my father sent for me. I saw he was dying. I took his hand in mine. He said: 'My son, my body is returning to my mother earth, and my spirit is going very soon to see the Great Spirit Chief. When I am gone, think of your country. You are the chief of these people. They look to you to guide them. Always remember that your father never sold his country. You must stop your ears whenever you are asked to sign a treaty selling your home. A few years more, and the white men will be all around you. They have their eyes on this land. My son, never forget my dying words. This country holds your father's body. Never sell the bones of your father and your mother'."

But the whites continued to come. Other white leaders met with Joseph after the death of his father. They demanded that he move his tribe to a reservation. He finally consented.

"I knew I had never sold my country," he said. "but I did not want bloodshed. I did not want my people killed. I did not want anybody killed."

War Already Started.

His people were restless and discontented. Upon his return he found that the war had already started. Some of the hot-blooded young Reds had killed white settlers. He condemned them but determined to fight. His plan was to lead his forces through Montana to Canada. But for the telegraph he would have succeeded, though he crossed three mountain ranges, carried his stock and the women and children with his army and was opposed by total forces numbering about four times his own. The curious reader may find the story of the various battles in the publications of the Montana Historical Library. As indicative of the courage of the man and of the sort of metal in his makeup read the following:

"About seventy men, myself among them, were cut off. My little daughter, twelve years of age, was with me. I gave her a rope, and told her to catch a horse and join the others who were cut off from the camp. I have not seen her since, but I have learned that she is alive and well.

"I thought of my wife and children, who were now surrounded by soldiers, and I resolved to go to them or die. With a prayer in my mouth to the Great Spirit Chief who rules above, I dashed unarmed through the line of soldiers. It seemed to me that there were guns on every side, before and behind me. My clothes were cut to pieces and my horse was wounded, but I was not hurt. As I reached the door of my lodge, my wife handed me my rifle, saying: 'Here's your gun. Fight!' "

He escaped from this surprise attack but finally was surrounded. The tele-

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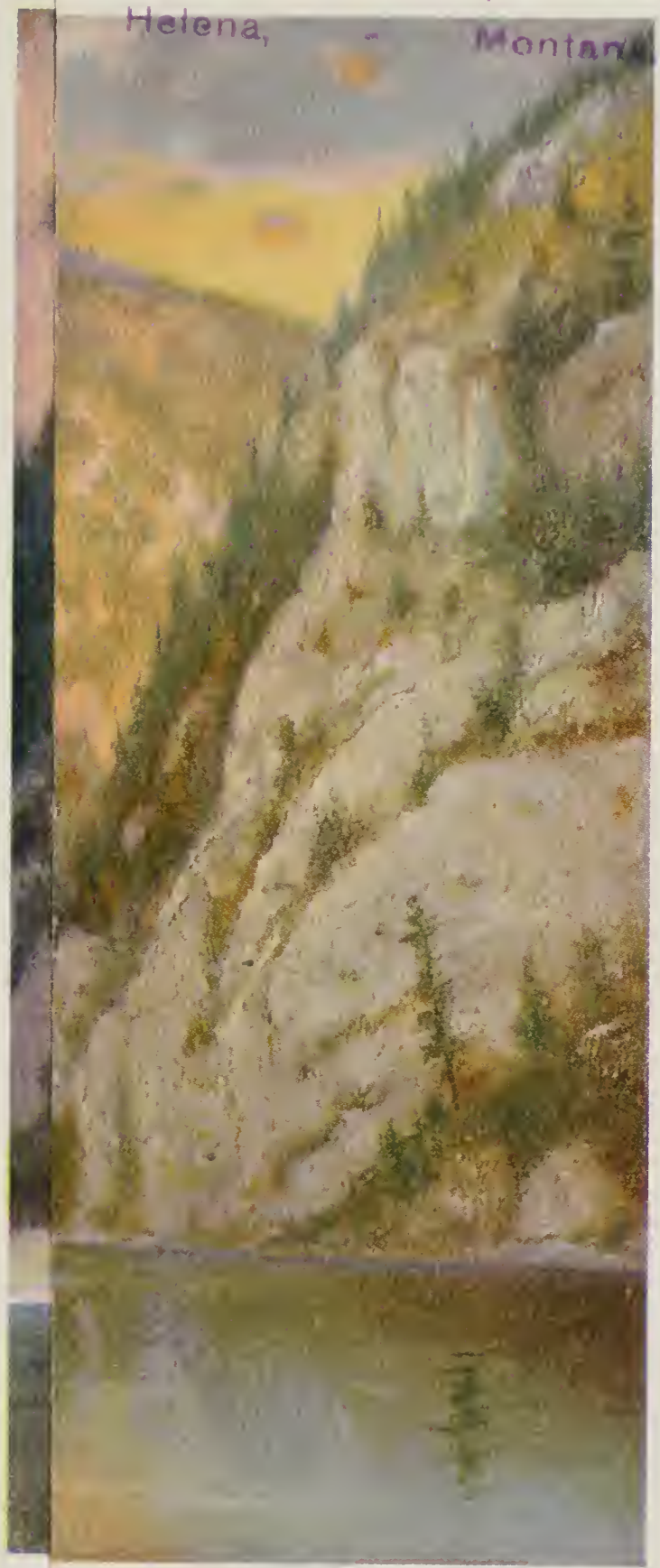

FROM A PAINTING BY R. E. DECAMP

Th lark, as follows: "Nothing can be im-
agi ith destruction. During the whole dis-
tan few yards, in which a man can stand
bet 'The Gate of the Rocky Mountains.'"

LIBRARY
Helena, Montana

FROM A PAINTING BY R. E. DECAMP

The Gate of the Mountains, near Helena. Described by Meriwether Lewis in the official journal of Lewis and Clark, as follows: "Nothing can be imagined more tremendous than the frowning darkness of the rocks, which project over the river and menace us with destruction. During the whole distance the water is very deep, even at the edges, and for the first three miles there is not a spot, except one of a few yards, in which a man can stand between the water and the towering perpendicular of the mountains. This extraordinary range of rocks we call, 'The Gate of the Rocky Mountains.'"

ANACONDA, MONTANA—Site of the world's largest non-ferrous smelter. A clean and attractive city of 12,000. In the background is seen the Anaconda Reduction Department of the Anaconda Copper Mining Company. In the foregoing lies Washoe Park, maintained by the Company as a community athletic and recreational center.

and attractive city of 12,000. In the background
. In the foregoing lies Washoe Park, maintained

graph had gotten the better of his generalship. A party of soldiers, under the command of Col. Nelson A. Miles, took him unawares near what is now Chinook, Montana. He could not bear to see his wounded men and women suffer longer.

"On the fifth day I went to General Miles and gave up my gun, and said, 'From where the sun now stands I will fight no more.'" He kept his word.

Joseph concludes his remarkable interview with a pathetic plea for tolerance.

"I know that my race must change," he conceded. "We cannot hold our own with the white men as we are. We only ask an even chance to live as other men live. We ask to be recognized as men. We ask that the same law shall work alike on all men. If an Indian breaks the law, punish him by the law. If the white man breaks the law, punish him also.

"Let me be a free man—free to travel, free to stop, free to work, free to trade, where I chose; free to choose my own teachers, free to follow the religion of my fathers free to think and talk and act for myself—and I will obey every law, or submit to the penalty.

"Whenever the white man treats the Indian as they treat each other, then we shall have no more wars. We shall be all alike—brothers of one father and one mother, with one sky above us and one country around us, and one government for all. Then the Great Spirit Chief who rules above will smile upon this land, and send rain to wash out the bloody spots made by brothers' hands upon the face of the earth."

Custer's Last Fight.

If the Nez Perce were a gentle, peace loving people, slow to wrath, the Sioux were exactly the opposite. They were treacherous, cruel, bloodthirsty. But they were brave. Witness the complete extermination of General Geo. A. Custer's entire command of 264 men before 5,000 Sioux and Cheyenne warriors!

A picture of the Custer massacre can best be secured by a study of a painting by the late E. S. Paxson, Montana artist. This painting now hangs in the Law Library of the State University at Missoula. It is reproduced in this section of the Montana book.

Mr. Paxson made a specialty of Indian subjects. He talked with Indians who were in the battle, (the whites were killed to the last man), and learned from them the exact positions of the principal victims. The painting is said to be historically accurate in every particular.

The Sioux were a powerful tribe. A large number of soldiers, under three generals were sent to subdue them. Custer was sent with twelve companies of cavalry—the Seventh Regiment—with orders to attack and not permit the Indians to escape to the south. The other two divisions were to follow more slowly. At the Little Big Horn, Custer divided his forces into three battalions, taking five companies under his immediate command. The Indians were supposed to number from eight hundred to one thousand; instead, from three to five thousand Sioux and Cheyennes engaged him in battle and utterly annihilated his entire command. The Sioux escaped carrying their dead with them, later to be hunted down and returned to the reservation.

The Name Montana.

James M. Ashley, one of our territorial governors, gave Montana her name. "I cannot tell who first mentioned the name," writes Sidney Edgerton, the first governor of Montana, "but the man who fought most earnestly for the name was the Honorable James M. Ashley, chairman of the committee on territories."

On February 11, 1863, the bill for the organization of the territory was reported; it passed on May 3rd. When Mr. Ashley suggested the name to Senator Charles Sumner, the senator demanded, "Where did you get that name?"

"It is a Latin name meaning mountainous," Ashley replied.

"There is no such word."

"Oh, yes there is." And Ashley found it for the senator.

The Railroad.

The last spike on the Northern Pacific, the first transcontinental road to span Montana, was driven at a point between Garrison and Gold Creek on September 8, 1883; Montana gained statehood in 1889.

The New Era.

The Custer fight—massacre is a misnomer for it, for the valorous representatives of the white race went down with weapons in their hands—marked the begin-

ning of a new era in Montana. It aroused the nation to action and a determination to clear this section once for all of the hostiles who were preying upon settlers and menacing survey crews for the Northern Pacific, then pushing its way through Dakota. Within little more than a year, the Reds had been herded back to the reservation and except for a minor outbreak or two, involving a few individuals rebelling against the rule of an Indian agent, the sound of a gun in organized conflict fired has not since been heard. It marked the emergence of Montana from an uncharted wilderness to a modern commonwealth. Even in Montana we find it difficult to realize that only a little more than fifty years has elapsed since an age of savagery, when wild beasts roamed the plains and the Indian in unfettered freedom built his wigwam.

The conditions out of which our pioneers were moulded exist no longer, gone they are like the stage coach and the buffalo. Within a stone's throw of where Custer and his command fell, now is located the world's largest wheat farm. There are no more frontiers. Through the wilderness runs the electric locomotive and the auto. Over, flies the airplane. In unsettled regions held by the federal government the forester and game warden hold the despoiler in awe. We are living in a new Montana, and the history of the state in the last fifty years is largely the history of the development of our growing industries.

The Pioneers.

And yet Montanans will always remember with pride the stories of our "old-timers," who carved out of a continent an empire for coming millions. They came here, perchance, outlawed from childhood's home. In the wilderness there were none to demand a passport. They came, in sheer love of adventure, in quest of shining metal, probably resolved to return to their homes, but the lure of Montana grew stronger with the passing years and they remained to live and die in the Treasure State. They came here, fleeing the shams and conventionalities of the older states, to read no more, "it is forbidden," "this is private property," "keep off the grass." From the sunny Southland, from bleak New England, from

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the lowlands of the Great Father of Waters, from Canada, from the Old World, from all lands they came, bringing new ideas and deep-rooted customs and strange creeds; but no matter whence they came or what they believed, always they were forced to face stern facts, to endure the hardships of an untamed wilderness, to fight with wild beasts and savages and hunger. Out of the conflict they became men, citizens, Montanans. Always will the citizens of this state cherish their names.

* * * * * * *

The foregoing brief sketch of Montana's early romantic history will be slightly supplemented in the various chapters to follow in this volume, but Montana presents to the historical student a fascinating field; for the history of Montana has not yet been wholly written. The job, in part, awaits the right man or woman.

New Histories.

Three Montana men (Paul C. Phillips, professor of history at the University of Montana; C. G. Manning, superintendent of schools at Lewistown, and R. G. Raymer, formerly professor of history at Intermountain college, Helena) are now preparing new histories of the State.

Historical Points of Interest.

FORT UNION: Formerly known as Mondak but now called after old fort that stood on present site a century ago. In 1829 was chief establishment of American Fur Company on upper Missouri. Original fort was one of most formidable and best equipped in northwest. Reigned over territory as large as all Europe; traded with Indians from all northwest tribes. Just across river from northern end of lower Yellowstone U. S. Reclamation Service Project. On Great Northern and Theodore Roosevelt Highway. Roosevelt county.

WOLF POINT: Originally the site of an Indian village, former pioneer trading post. Indian burial grounds located near. Derived name from fact that region was favorite haunt of large gray wolves hunted for their pelts. Today is center of farming and stock raising community. On Great Northern and Theodore Roosevelt Highway. Roosevelt county.

GLASGOW: Once famous "cow town" and home of Indian chief, Sitting Bull, leader of the Custer massacre. Enterprising, modern, up to date city; center of U. S. Milk River Irrigation Project for adjacent territory. On Great Northern and Theodore Roosevelt Highway. Valley county.

BUFFALO ON BISON RESERVE

CHINOOK: About sixteen miles south, on high bluffs, may be seen earthworks thrown up by Chief Joseph and Nez Perces Indians when overtaken, in forced retreat, by United States troops under General Miles. Present headquarters of Chinook division of Milk River Irrigation Project and gateway to Paradise Valley, one of the most advanced agricultural areas in northern Montana. On Great Northern and Theodore Roosevelt Highway. Blaine county.

FORT ASSINIBOINE: Seven miles southwest of Havre. Established in 1879 and at one time largest U. S. military organization in the west; now used as a demonstration farm for State Agricultural College. Hill county.

SPOTTED ROBE: Just west of Spotted Robe is old Rocky Mountain Trail, also known as Travois Trail, and Whiskey Trail. Said to have originally extended into South America, and used by Indians for centuries before coming into use by the trappers and hunters in the days of the "Old West." On Great Northern in Glacier county.

FORT BROWNING: Established by U. S. government in 1868 as agency headquarters for Gros Ventres Indians. Trading point for the Northwest Fur Company. In 1872 moved to Fort Belknap, 40 miles west of Milk River. Today is headquarters for Blackfeet Indian Reservation. On Great Northern, Theodore Roosevelt Highway and Yellowstone-Glacier Bee Line. Glacier county.

MILES CITY: Old frontier town and once important army and river navigation point. Always noted as horse and cattle market; once largest horse market in the United States. Center for stock and dairy ranches; U. S. Range Livestock Experiment Station located here. On Northern Pacific, National Parks and Regina-Yellowstone Highways, also Yellowstone Trail. Custer county.

BIG HORN: Lewis and Clark passed through this region on expedition in 1806. In 1807 Manuel Lisa, frontiersman, established trading post here. Rocky Mountain Fur Company established post near here in 1822. From here in 1876 Gen. Gibbons crossed Yellowstone River with 450 men to aid Gen. Custer in Battle of Little Big Horn, already lost. On Northern Pacific, Yellowstone Trail and National Parks Highway. Treasure county.

POMPEY'S PILLAR: Oval shaped rock, 200 feet high. Of historic value in that Captain Clark climbed it in 1806 and cut his name on the surface. About 20 miles southwest of Custer or 36 miles northeast of Billings. On Northern Pacific, Yellowstone Trail and National Parks Highway. Yellowstone county.

CUSTER BATTLEFIELD: The progress of the fight is marked, in the National Cemetery, by small white crosses, each denoting the spot where a soldier fell. It was here in 1876 that Custer, and his entire command of 260 men, perished in a battle with the Indians. Granite shaft, erected to the memory of Custer, stands within 20 feet of spot where he fell. On Custer Battlefield Highway and C. B. & Q. Railway. Big Horn County.

SPRINGDALE: Along Yellowstone River near here, Lewis and Clark had all their horses stolen by Indians while homeward bound and were then forced to use "bull boats." On Northern Pacific, National Parks Highway and Dominion Yellowstone Trail. Park county.

LIVINGSTON: Capt. Clark and party in 1806 crossed pass just west of this city and camped at noon on present site of Livingston. Many Indian campaigns and battles have taken place in surrounding regions. Generals Miles, Terry, Gibbon, Custer, Crook, Baker and Forsyth campaigned here. Livingston is today the diverging point on the Northern Pacific for Yellowstone Park and the junction point of the Yellowstone Trail and National Park to Park Highway. Trade center for agricultural and stock raising territory. In Park county.

FORT ELLIS: Important military post during Indian wars; established in 1867 and abandoned in 1887; now only few old buildings remain to show location. About four or five miles west of Bozeman. On Northern Pacific and National Parks Highway. In Gallatin county.

THREE FORKS: Named because of the three rivers, Jefferson, Madison and Gallatin, which merge at this point forming the Missouri. Lewis and Clark spent several days here in 1805. Bronze tablet in public park erected in commemoration of Sacajawea, Indian woman guide for Lewis and Clark expedition, captured here by hostile Indians several years preceding the expedition. On the Northern Pacific and C. M. St. P. & P., and on National Parks Highway, Geysers to Glacier Road. In Gallatin county.

BANNACK: First capital of Montana territory. Gold discovered here in 1862. Approximately $60,000,000 produced during the early days in Bannack, Virginia City and other placer mining towns in this region. First quartz lode in Montana, the Deerlodge lode, located near here in 1862. Bannack is about 12 miles west of Dillon, which is on the Oregon Short Line, and about 5 miles south of Mill Point on the Scenic International Highway. In Beaverhead county.

HELENA: Established on the site of Last Chance Gulch where gold was discovered in 1864 and which produced over $40,000,000 in placer minings in the pioneer days. Scene of activity in Vigilante days. Today, present capital of Montana, typical modern progressive city of northwest; center for rich agricultural section of Prickly Pear Valley. Location of former U. S. Army Post, Fort Harrison, now U. S. Veterans' Hospital. On Great Northern and Northern Pacific, National Parks and Electric Highways, also Geysers to Glacier road. Lewis and Clark county.

GOLD CREEK: First discovery of gold in Montana was made in 1852 by the half-breed, Benetsee, at Pioneer, about six miles south of Gold Creek, along the creek of the same name. Discovery verified by the Stuart brothers six years later and mining begun

here in 1861. Tablet at confluence of Gold Creek with Little Blackfoot river commemorates discovery. Mining still carried on up this creek. On Northern Pacific and Chicago, Milwaukee St. Paul & Pacific railways and on Yellowstone Trail and National Parks Highway. In Powell county.

HELL-GATE: In Hell Gate Canyon extending between Drummond and Missoula, Montana. Post established at mouth of canyon in 1860 by Frank Worden and E. P. Higgins for purpose of trading with Indians. Said to have been one of "roughest" places in Montana during the early days. Moved to present site of Missoula in 1864 and a saw mill erected, new location called "Missoula Mills." Principal highway ran through this canyon by which the white man and the Indians before him crossed this mountainous region. First permanent wagon road in this section built in canyon by Mullan in 1859-62. Northern Pacific runs through here, on Yellowstone Trail and National Parks Highway. Missoula county.

DESMET: Named in honor of Father DeSmet, first missionary to Indians in this section and who established St. Mary's Mission at Stevensville in 1841. Father DeSmet was Montana's first husbandman, planting the first vegetables and building the first flour mill. On Northern Pacific and Scenic International Highway. Missoula county

RAVALLI: Named for Father Ravalli, missionary priest, who worked for 40 years among Indians in this region. On Northern Pacific, National Parks and Scenic International Highways. In Lake county.

FORT BENTON: Established by Alex Culbertson in 1846; chief trading point in Montana from 1860, when first steamers arrived from St. Louis, up to the building of the first railroad in 1883. Wagon freight trains departed from here for all points. Today is flourishing modern city, headquarters, market place and distributing point for prosperous farming territory. On Great Northern. In Chouteau county.

GIBBONS: Site of the battle of the Big Hole with Nez Perce Indians. Route over mountains is that followed by Lewis and Clark. About five miles to northwest of Wisdom. Wisdom is on the Scenic International Highway. In Beaverhead county.

VIRGINIA CITY: Gold discovered here in the "early sixties." About $60,000,000 placer mined in and around Virginia City, Bannack and vicinity. Second capital of Montana territory. Scene of operations of Vigilantes when George Slade and other notorious agents were hanged. On Northern Pacific and Vigilante Trail. In Madison county.

FORT OWEN: Originally site of St. Mary's Mission, built by Father DeSmet in 1841, sold in 1850 to Major Owen who changed name to his own and built fort for trading with Indians. Ruins located near Stevensville in Ravalli county. Stevensville is on Northern Pacific and Scenic International Highway.

LIBBY: Old pioneer town, long headquarters for gold miners. At headwaters of Libby Creek in Cabinet Mountains, placer mining has been carried on since 1865. Today chief market center for Kootenai Valley, splendid agricultural section. On Great Northern and Theodore Roosevelt Highway. In Lincoln county.

KOOTENAI CANYON: In the days of the early West steamboats plied the upper Kootenai River between Jennings, Montana, and Fort Steele in British Columbia, laden, on going trips, with prospectors, and their baggage, following stories of rich strikes in the Canadian Kootenai country, and returning with ore. Canyon extends along Kootenai River from Rexford, in northern part of Lincoln county, south then west to Yakt, on the border of the state.

ST. IGNATIUS: First log house in Montana, home of Angus McDonald, early agent for Hudson Bay fur traders, located few miles north of St. Ignatius, in Lake county.

Historical Monuments and Markers.

Mullan military road built in 1858 under supervision of Capt. John Mullan is marked by monuments in following places along road: Fort Benton, Great Falls, Deer Lodge, Drummond, Bonner, Missoula and DeBorgia.

Henderson Gulch: Monument erected here to memory of pioneer miners buried in this gulch. Henderson Gulch is located in Granite county.

Monument erected over grave of George Monteur, famous scout and interpreter to the Indians. Near north fork of the Blackfoot River in Powell county.

Bronze statue commemorating Marcus Daly, famous mining man of the state, erected on North Main street, Butte, Montana. In Silver Bow county.

Heroic bronze equestrian statue of Thomas F. Meagher, secretary and acting-governor of territory of Montana in 1865-67, erected on state capitol grounds, Helena, Montana. In Lewis and Clark county.

Tablets in capitol building commemorate worthy citizens of Montana, such as James Williams, captain of Alder Gulch Vigilante Committee; Robert Bruce Wallace, First Lieutenant, 2nd U. S. Cavalry; William A. Clark, big mining man of state; Robert Burns Smith, former governor of the state; Wilbur Fisk Sanders, pioneer soldier, statesman; First Montana Volunteers who lost lives in Spanish-American War.

Monument erected on Custer Battlefield to memory of General Custer and his command who fell in battle of the Little Big Horn. In Big Horn county.

Monument to memory of officers and men who died in battle of the Big Hole under command of Gen. John Gibbon in fight with Indians under Chief Joseph. In Beaverhead county.

Fort Benton honored memory of soldiers who died in World War with monument erected here. Chouteau county.

Monument erected to commemorate Lewis and Clark expedition in 1805-6 and exploration of Marias River and vicinity. In Toole county.

Bronze statue of John F. Stevens, chief engineer in building of Great Northern Railway over Pass, erected near Marias Pass, short distance west of Glacier Park.

Monument marking site of first capitol of territory in Bannack, Beaverhead county, Montana.

Monument marks Lolo Pass, important point in Lewis and Clark expedition of 1805. In Missoula county.

At Livingston, Park county, Montana, a monument is erected to the memory of John M. Bozeman, pioneer trapper, trail blazer and famous Indian fighter.

Bronze tablet in Catholic churchyard, Stevensville, Ravalli county, Montana, honors memory of Fathers DeSmet and Ravalli, famous Jesuit missionaries of early days of Montana.

Marker at entrance to fair grounds, Billings, Montana, commemorates Clark's journey down Yellowstone River. In Yellowstone county.

Brass tablet on Montana Club building, Helena, Lewis and Clark county, Montana, commemorates discovery of gold in Last Chance Gulch in 1864.

Monument erected to the memory of Sacajawea, who led Lewis and Clark expedition in 1805, at Armstead, in southern Beaverhead county.

Meriwether monument erected at the Gates of the Mountains to the discoverer of this canyon in 1805 while en route up the Missouri on the Lewis and Clark expedition, about 18 miles north of Helena, Montana.

Bronze tablet in public park of Three Forks commemorating Sacajawea, Indian woman guide for Lewis & Clark expedition. In Gallatin county.

That the people of the State are interested in Montana history, is indicated by the following prepared by the librarian of the State Historical Society:

Historical Library.

The Historical Society of Montana was incorporated by an act of the first territorial legislative assembly, approved February 2, 1865, by the following persons: H. L. Hosmer, C. P. Higgins, John Owen, Granville Stuart, James Stuart, W. F. Sanders, Malcolm Clarke, F. M. Thompson, William Graham, W. W. DeLacy, C. E. Irvine and Charles S. Bagg. It was created, as stated in section one of the

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act, "in order to collect and arrange facts in regard to the early history of this territory, the discovery of its mines, incidents of the fur trade, etc."

First headquarters were at Virginia City, later Deer Lodge, and then Helena. In the disastrous fire of January 9, 1874, which swept the upper one-third of Helena, the valuable accumulations of the society were entirely destroyed. Undismayed, the officers and members set at work to restore the newspaper files, manuscripts, historical books, records and museum collections, and soon had a very respectable collection.

Later a room for collected material was secured in the Lewis and Clark county court house, and occupied for the first time July 5, 1887. In 1893 the property of the Historical Society came under the control of the state. By an act of the legislature, its management was placed under control of a board of five trustees, appointed by the Governor. On the completion of the State Capitol in 1902, the present quarters were occupied.

From a historical point of view, it is interesting to note that at the first meeting of the incorporators, held at Virginia City on April 20, 1865, the following officers were elected: President, Wilbur F. Sanders; vice-president, Granville Stuart; corresponding secretary, W. E. Cullen; recording secretary, Cornelius Hedges; librarian, Charles Rumley.

The library contains 40,000 rare books, many of which are now out of print, and nearly 4,000 volumes of bound newspaper files. The first four years of the Montana Post is complete, commencing on August 27, 1864, at Virginia City; also the practically complete files of the Helena Herald, Rocky Mountain Gazette, Helena Independent, Avant Courier, Rocky Mountain Husbandman, River Press and Fort Benton Record.

A TOURIST CAMP

The library contains an accumulation of photographs, and manuscripts from pioneers, carefully filed away and indexed. On the walls are hung eighty splendid oil portraits of prominent pioneers, and many enlarged framed photographs.

The museum collection consists of thousands of relics, curios and one of the finest mineral collections in the country. This entire collection has not cost the state a dollar. It has been donated by interested pioneers from early territorial times. Hardly a day passes without some interesting material being sent to the library for preservation.

The expense of maintaining the library is borne by the state, by legislative appropriations. The present working force consists of David Hilger, librarian, and Mrs. Ann McDonnell, assistant librarian. The present board of trustees consists of Pat Carney, Waterloo, W. M. Bole, Great Falls, W. A. Hedges of Lewistown, Mrs. Josephine I. Hepner of Helena, and David Hilger of Helena. The society has published nine volumes of contributions. They are of great value to the historical student. Volume ten is ready for the printer.

The collection of Indian photographs, manuscripts, curios and historical data, is one of the best in the northwest.

A cordial invitation to visit the library is extended to all visitors at the State Capitol.

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MONTANA GEOGRAPHY

The plains, the valleys, the mountains, the waters, each constitute a part of Montana's greatness.

On the back cover of this volume will be found a map of the state. Prospective settlers are urged to study it and the other maps in this volume with care, and to read the following few pages of Montana geography. No one can hope to understand Montana without knowing a little of the geography of the State.

Montana is so big. Her resources are so varied. The State is in the infancy of development. Much has been accomplished; much more remains to be done.

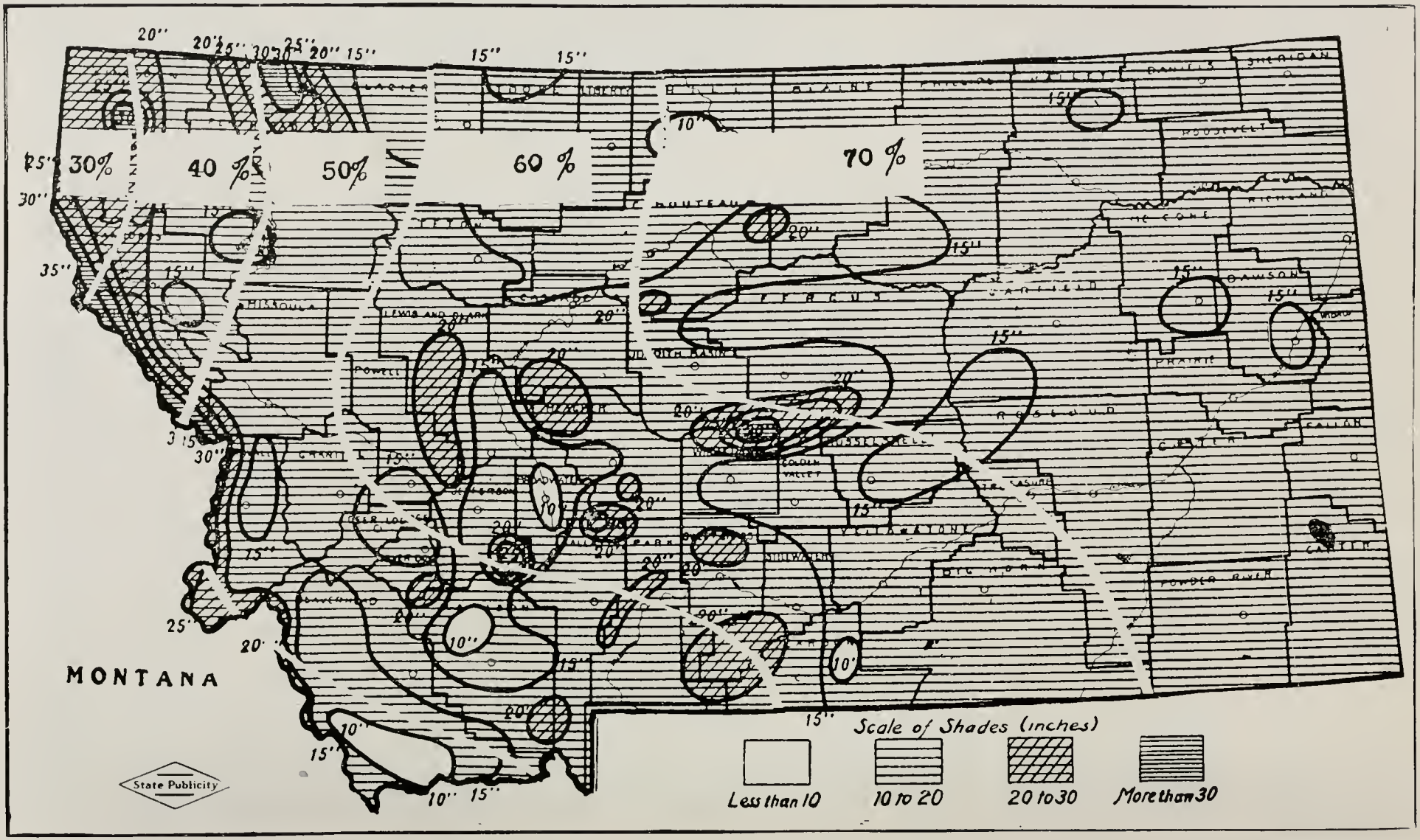
The work of founding the commonwealth, clearing the way, proving the soil and making a start in the industries has been begun. The experiments of others will benefit those who now come.

Montana has the land and the resources to sustain a large population. There are mines waiting to be opened. There are new industries which are to be started. There are millions of acres of fertile soil which will provide homes and support for hundreds of thousands.

Montana has coal, and iron ore; limestone, and hydro-electric power. Steel is the inevitable heritage of the Treasure State. As this is written reports come from Butte indicating that city to be under consideration as a suitable location for a steel plant. The present proposal may fall through, but the State is certain to become in time a great manufacturing and industrial as well as a mining and agricultural state, and steel will play its part in this development. Some day the night will never be dark in this Commonwealth. Always in the sky will be the flicker of the furnaces of steel. Strong hard-handed sons of toil will sweat and wrestle with base molten metal as they now do with gold and silver and copper. No one can understand the Montana of today: or hope to roll back the curtains of the future for the most momentary glimpses of the Montana of tomorrow, without some knowledge of her geography and her people. This little book attempts in a brief way to visualize Montana as a whole. Hence, a few pages on her plains, her mountains, her waters, her valleys, and her climate follow.

Attention is also called to the chapter on the Counties of Montana, and the chapter on Fuel and Energy Resources.

AVERAGE ANNUAL RAINFALL AND PERCENTAGE FALLING BETWEEN APRIL 1 AND SEPTEMBER 30.



THE SIZE OF MONTANA

Average Length East and West 535 Miles—Average Width North and South 275 Miles.

Montana—a Latin word signifying mountainous—is of imperial proportions, a mammoth state of 94,078,080 acres.

It should always be remembered that Montana is big, in any consideration of its climate, its resources and its opportunities.

It is the third state in size in the Union, only Texas and California being larger; France and Germany are each only about one-third larger. England, Scotland, Wales and Ireland combined have fewer miles of territory; Montana embraces a greater area than all the New England states, New York, New Jersey, Delaware and Maryland added together.

Another table of comparison is in square miles. Montana has an area of 146,572 square miles, including a water surface of 770 square miles. Ohio, Illinois and Indiana combined contain 136,060 square miles; Kentucky, Tennessee and Georgia only 141,925.

Location.

Montana is the keystone state of the great American Northwest. It lies between the 104th and 116th meridians of longitude west of Greenwich and between the 45th and 49th parallels of north latitude.

FRUIT FARM ON THE SHORES OF FLATHEAD LAKE

CLASSIFICATION OF LAND

Western Montana Region of Timbered, Well Watered Mountains—Farming, Grazing and Mountain Lands.

The main range of the Rocky Mountains crosses the western part of Montana, roughly dividing the State into two sections of unequal size, western and eastern Montana. About one-third of the State's area is in western Montana, two-thirds in eastern Montana.

The part of the State that lies on the western side is a region of mountain ranges, interspersed with large or small valleys of frequent occurrence, and small streams. Foot hills and mountains are usually heavily timbered.

Eastern Montana consists generally of level, undulating table land.

From the extreme boundary to the back-bone of the continent the land gradually increases in elevation and forms a great plain of rolling country, large enough to contain several of the older states.

Lands fall about equally into three classes: Farm lands, grazing lands and mountain lands. Each class comprises about 30 million acres. Lands of the three classes sometimes lie close together; there is no sharp line of distinction between them and their boundaries are not sharply defined. In many counties farm lands abut on mountains; more often the order is: (1) Farm lands, (2) Foot-hills valuable for grazing, (3) Mountains covered with timber. The transition from lands of one class to those of another is sometimes very gradual and hard to determine. On the other hand, much of the land often clearly indicates the use to which it is best suited.

WHEAT FIELD IN CENTRAL MONTANA, WITH MOUNTAINS IN BACKGROUND

THE ALTITUDE OF MONTANA

Elevation Much Less Than Great Mountain Belt of Colorado, Wyoming, New Mexico and Nevada.

A fact not generally understood but of prime importance in its bearing on climate and consequently on crop production is that the elevation of both mountains and valleys in Montana is much less than that of the great mountain belt of Colorado, Wyoming, New Mexico, Utah and Nevada. The elevation of Santa Fe is 6,840 feet; of Denver, 5,300; of Salt Lake City, 4,350, and of Helena (near the base of the Continental Divide), 4 110 feet. The passes across the Rocky Mountains are also lower than in other states. The Northern Pacific Railway crosses the Continental Divide at Mullan Pass at an altitude of 5,547 feet. The Chicago, Milwaukee St. Paul & Pacific and the Great Northern cross at elevations not much higher.

The United States Geological Survey shows the average elevation of Montana above sea level to be 3,900 feet. Other states average: Nevada, 5,600 feet; Wyoming, 6,400 feet; Colorado, 7,000 feet. None of Utah and only 9 000 square miles of Colorado is below 4,000 feet, while 51,600 square miles of Montana are less than 4,000 feet and 40,700 square miles are less than 3,000 feet above sea level. "Taking the area of the state," (Montana as a whole) says U. S. Census Bulletin 153, "it has been ascertained that 49 per cent is under 5,000 feet above sea level; 21 per cent from 5,000 to 6,000 feet; 14 per cent from 6,000 to 7.000 feet; 9 per cent from 7,000 to 8,000 feet, and 7 per cent over 8,000 feet." The influence of altitude upon climate and crop production is too well known to need comment; but attention is especially invited to the figures which show how vast is the area of lands at a low altitude and to the fact that some of the most productive grain fields of the world are to be found in Montana at elevations greater than 5,000 feet.

CENTRAL MONTANA STREAM

MOUNTAIN PASSES

Highest Railroad Pass Is Only 6332 Feet—Warm Winds Temper Climate. Lowest Railroad Pass 5202 Feet.

The low elevation at which the railroad lines cross the Continental divide, the hundreds of miles of moderate grades before entering the main range, and the altitude at the eastern and western boundaries, are facts which make evident the fortunate position that Montana occupies among the mountain states. Numerous low passes exist, and through these passes the warm winds from the Pacific ocean find their way and temper the climate. The Northern Pacific Railroad crosses the Continental Divide at Mullan Pass at an elevation of 5,547 feet; Summit, the highest point on the Great Northern Railway is 5,202 feet above sea level; and the elevation of Donald, the station of highest elevation in the Rocky Mountains on the line of the Chicago, Milwaukee St. Paul & Pacific Railroad, is only 6,332 feet.

Before reaching the point of crossing, the Great Northern Railroad runs 475 miles through the northern part of the state east of the main range, in that distance climbing from 1 922 to 5,202 feet; from the eastern boundary of Montana to the Mullan Pass by the line of the Northern Pacific Railroad is 516 miles; and Chicago, Milwaukee St. Paul & Pacific trains travel 504 miles in Montana before reaching the tunnel through which they pass from the Atlantic slope to the Pacific slope of the continent.

The passes are all lower than those in states south of Montana, and as a consequence, the Montana railroads attain no heart breaking altitudes. At both the eastern and western boundaries the elevation of railroad tracks is less than 2,000 feet. In Western Montana the Northern Pacific Railway parallels for many miles the Coeur d' Alene Mountains, follows the Clarks Fork River and leaves the state at an elevation of about 2,200 feet, the Chicago, Milwaukee St. Paul & Pacific climbs the range and crosses it with only a slight deviation from its westward course; and the Great Northern Railway, which runs along the banks of the Kootenai River passes out of the State at an altitude only slightly greater than 1,800 feet.

Mountain Passes.

MARIAS PASS: On the southern boundary of Glacier National Park, in main range of Rocky Mountains. Altitude, 5,215 feet above sea level. In 1853 Isaac I. Stevens, governor of the territory of Washington, and his party made the first investigation for this pass but were unable to locate it. Pass was discovered in 1889 by John F. Stevens, engineer for the Great Northern. Monument erected to commemorate his discovery near top of pass.

MULLAN PASS: Crosses the main divide of the Rockies just west of Helena. Discovered by Lieutenant Mullan, of Governor Steven's party, in 1853. Work on the Mullan tunnel started in 1881 by the Northern Pacific. Altitude of pass, 5,834 feet above sea level. In Lewis and Clark county.

BOZEMAN PASS: Crosses the Belt Range between Livingston and Bozeman. Height, 5,813 feet above sea level. This pass was used by the Lewis and Clark expedition in 1805. Work on the Northern Pacific tunnel through the pass was begun in 1882. In Gallatin county.

LOLO PASS: Crosses main Continental Divide on boundary line of state about 35 miles southwest of Missoula. Height, 5,233 feet above sea level. In Missoula county.

LEWIS AND CLARK PASS: Crosses main divide of Rockies about 40 miles northwest of Helena. Lewis and Clark expedition crossed here in 1805. Height about 6,350 feet above sea level. In Lewis and Clark county.

PIPESTONE PASS: Crosses main range of Rockies about 20 miles southeast of Butte. Height, 6,502 feet above sea level. In Jefferson county.

HOMESTAKE PASS: Crosses main range of Rocky Mountains between Whitehall and Butte. About same height as Pipestone Pass. In Jefferson county.

THE MOUNTAIN AREA

The Treasure Vault of the Treasure State—Mineral and Thermal Springs —Grand and Picturesque Scenery—Many Prosperous Valleys—Mining Operations.

The melodious name Montana—selected as the name of the territory when it was created in 1864—is appropriate to one-third of the state, the mountain area, containing about 30,000,000 acres. But even the mountain area is interspersed with productive valleys in which are located some of the most prosperous cities of the State. The mountain area is the treasure vault of the Treasure State, in which are found gold, silver, lead, copper, coal, iron, manganese, marble, building stone, asbestos, corundum, petroleum; even precious stones, the sapphire, the ruby and the garnet. (See chapters in this volume on Mining in Montana, and Fuel and Energy Resources.) In this region are found the great forests of Montana, one of the chief assets of the State. (See chapter on Lumbering in Montana.)

In the mountains are many mineral and thermal springs whose waters are beneficial in the treatment of various diseases. Some of these are near railroad stations, have ample accommodations for visitors and are largely frequented. There are other springs which are remote from railroads and whose merits will become better known when improved transportation facilities permit easier access to them.

The mountains contain wood and water which are essential for mining operations and prospecting, great parks affording splendid pasturage for stock; they harbor the game the hunter and fisherman seek, and their grand and picturesque scenery appeals to lovers of the sublime and beautiful.

(See chapter on Recreational Resources.)

TEN-MILE CREEK NEAR HELENA

WATER SUPPLY

At the Lowest Records in History, Montana Had Sufficient Water to Irrigate Ten Million Acres.

Montana is generously watered. The two great rivers of the United States have their source in Montana. They are the Missouri, which drains over two-thirds of the State, and the Columbia, which drains a large portion of western Montana. The Missouri is formed at Three Forks by the union of the Jefferson, Madison and Gallatin. It flows north, then east, through the central northern part of the state.

The western section of the State abounds in streams, which drain into the Kootenai and the Clark's Fork of the Columbia. A few are the Bitter Root, the Big Blackfoot, the Hellgate, the Missoula, the Deer Lodge and the Flathead.

Another large river is the Yellowstone, which has numerous affluents, the Powder, Tongue, Rosebud, Big Horn, Stillwater and Boulder, draining all the southeastern part of the State and carrying nearly as much water as the Missouri.

At the lowest water records in the history of the State, there was sufficient water in Montana to irrigate ten million acres, four million more than the estimated amount of land that can at reasonable expense be irrigated. Stated in another way the annual flow of water out of the state is sufficient to cover the entire state with water to a depth of six inches.

The waters of Montana do not go off in great floods. In almost every mountain range are glaciers and fields of perpetual ice and snow. The snow that falls in winter melts in different altitudes at different times and insures a steady flow of water at all seasons. From every mountain issue beautiful streams. Pure, clear and cold they come dashing down, making their way seaward, in some cases with tremendous falls. The fall of the streams cheapens the cost of irrigation.

LAKES

Flathead, a Picturesque Body of Water, the Largest, but Montana Has Thousands of Beautiful Lakes.

In one corner of the great Glacier National park rise three small streams, whose sources are close together.

The waters of one stream find their way to the Pacific Ocean, those of another to the Hudson Bay, while those of a third make the long journey to the Gulf of Mexico. At the head of each of these streams is a small mountain lake typifying the thousands of lakes and reservoirs in the state of Montana. Many of these lakes contain but a few acres, others are miles in length.

Flathead Lake is the largest; it is about 30 miles long and 15 miles wide, covering an area of about 200 square miles. It is a most picturesque body of water, with a score of small islands and many bays and inlets.

Thousands of other lakes, large and small nestle in the mountains, holding water for irrigation. There is scarcely a county in all Montana's fifty-six that does not have its favorite lake. (Attention is also called to the chapters in this book called "Forest and Recreational Resources.")

ON THE CLARK'S FORK, A FEW MILES FROM FLATHEAD LAKE

SOIL AND SUNSHINE

No Large Area of "Bad Lands"—Few Soil Surveys—Percentage of Possible Amount of Sunshine High in State.

There is a great difference in the soil in the various sections of Montana, but there is comparatively a small area which will not produce some useful plant. There is no true desert, no great area of "bad lands."

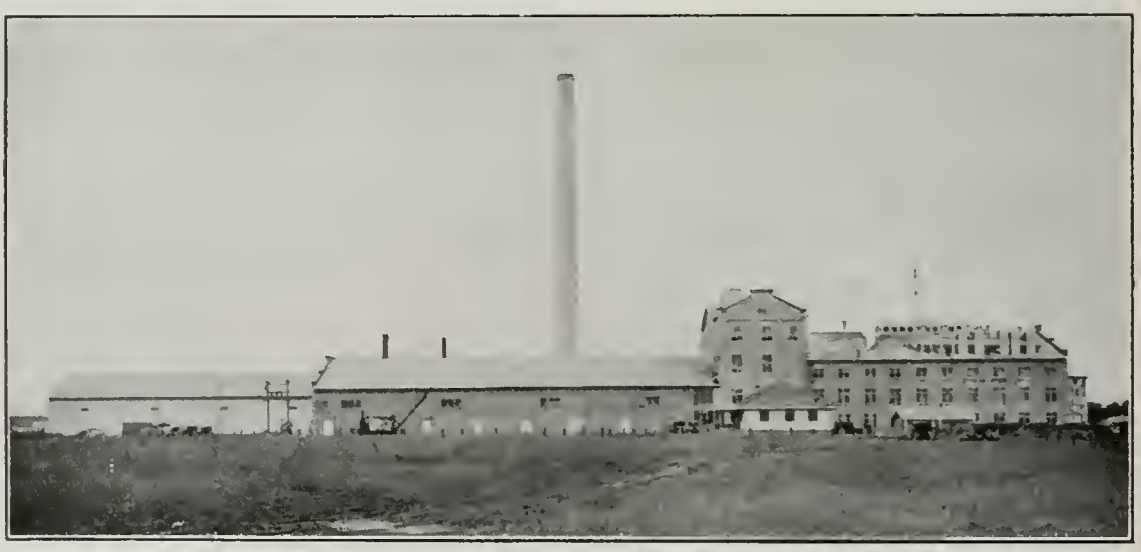
Generally speaking, the soil throughout the state is rich in the primary elements of fertility. It has not been impoverished by constant rains, or a succession of exhausting crops. At high altitudes the season is short; above certain elevations the crops will not mature; at the lowest elevations tomatoes and the tender vegetables thrive. Topographical conditions modify temperatures, the winds and the forests, and the settler should make a careful study of the data furnished in the next chapter by the United States weather bureau before making a location. Soil surveys of a number of counties have been made by the Montana State College and the officials of the experiment station should be consulted by the newcomer.

Sunshine.

Another reason for the luxuriance of the crops grown in Montana in a comparatively short growing season, not understood by many who live in a lower altitude, is that the percentage of sunshine is greater in this state than in the states to the east or west.

As an illustration of the sunshiny days in this state, Miles City, in Southeastern Montana has an average of 1,767 hours of sunshine between April 1, and September 30, as compared with 1,585 hours for Madison, Wisconsin; 1,639 hours for Terre Haute, Indiana; 1,574 hours for Detroit, Michigan, and 1,677 hours for St. Louis, Missouri. In other words, Miles City has from 110 to 193 more hours of sunshine during the growing season, than have the other sections with which the comparisons are made.

The claim has thus been made and is at least partially sustained by weather records that there are five hours of sunshine in Montana to four hours in the Mississippi valley. And another favorable factor for plant growth is that while the rainfall is small, it comes when it does most service. But this will be discussed in the next chapter. Attention is called to the map on the first page of this chapter.



SUGAR BEET FACTORY AT CHINOOK

MONTANA CLIMATE

Monthly and Annual Temperatures and Precipitation Normals at 100 Stations Outlined.

By W. T. Lathrop.

In the three largest states in the Union, Texas, California and Montana, each so differently situated geographically and with such variety in the matters of topography and elevation, diversity of climate becomes evident upon even casual examination. Each of these states has its own climatic distinctions and wide variations. The first casual factor that engages the attention of the climatologist in viewing such distinctions, is the presence of a seaboard in both Texas and California, while Montana is an interior state with its lowest elevations nearly 2,000 feet above sea-level, with rugged and high ranges and ridges of the Rocky Mountains within it and along its western border, and with the Continental Divide traversing its western sections. Then, too, Montana lies further north than any portion of Texas or California. This latter circumstance, while it is immediately linked up with thought of lower temperatures, is not generally so quickly recognized as lengthening the summer days and prolonging the daily tonic action of direct sunlight upon growing vegetation through the diminished atmospheric screen.

We find it necessary, or at least desirable, in Montana continually to refute statements made upon misinformation that the State, or some part of it, is the coldest place in the United States. It is not denied that occasionally very low temperatures do occur in Montana in winter, but they are neither as persistent nor often as low as many people in other parts of the country believe, and the charts of temperature distribution based upon official and unprejudiced observations collected by the Government show that the coldest areas in the United States, in winter and for the year, lie to the eastward of Montana. The highest temperatures on record for a number of Montana stations are higher than have ever been recorded in Alabama, Georgia, Florida, or in Cuba, but we make no claim from this fact that Montana is warmer than those sections. Yet such a claim would be justifiable if we yielded to the assertion that Montana is coldest of all the states simply because it has happened that an extreme of low temperature has been registered within its lines. The northern plains and mountain slopes show wide extremes of temperature in both directions, high and low. The range covered by all the temperatures ever recorded officially in Montana extends from—65° to 117°. Nor is this especially notable; it is typical of sections far in the interior of a large continent and in a moderately high latitude. The average range from our lowest to our highest temperature is very much less, though still ample and

ELK IN YELLOWSTONE PARK AREA

placing a strong accent upon the difference between summer and winter. Moreover, in both seasons the relative dryness of the atmosphere greatly mitigates the physical discomfort arising from the temperature conditions. The dry, warm days are more easily endurable than humid, warm days, and the dry cold of winter is far less trying than the humid cold of certain other parts of the country. This statement is superfluous to those who have lived both in Montana and in damp regions.

There is much variability of weather in Montana from year to year in the corresponding seasons. Once in a while a winter month is conspicuous for its cold, and again for its warmth. In only one month since statewide service was instituted, in other words in a record going back to 1895, has the average of all temperature observations been under zero. That once was in the month of January, 1916, when a mean or average temperature of —0.7° was recorded for the State. On the other hand, the January mean has been as high as 29.2° (in 1919), which is higher than any January mean ever recorded in North Dakota, South Dakota, Minnesota, Iowa, Wisconsin, Michigan or, with three exceptions in a longer record, in the state of New York, and similarly with three exceptions, in New England. Of North Dakota's several months with lower average temperatures than have ever been recorded in Montana, one was January, 1916, when her mean temperature was —6.4°, while Montana's for the same month was, as above noted —0.7°. Minnesota's coldest month was January, 1912, with a mean temperature of —6.7°. Wisconsin's coldest month, with a mean temperature of —2.5°, occurred at the same time.

January is normally our coldest month and July our warmest. The July average temperature in Montana has varied from 60.1° in 1915 to 70.2° in 1917. The average for the Julys from 1895 to 1925 is 66.2°, which, while pleasantly warm, is lower than the July normal mean temperature for North Dakota, South Dakota, Minnesota, Wisconsin, Michigan, Ohio, Pennsylvania, New York, or New England.

Cooler winters and warmer summers—or a greater difference between winter cold and summer heat—distinguish the eastern part of Montana, a plains country, from the mountainous western portion. The southern and western river valleys are, in the averages, the warmest areas in the State. Billings, in the Yellowstone Valley, with a mean annual temperature of 46.2°, is the warmest station with a long record. It is equalled in a very short record by Melstone, in the Musselshell Valley, and closely followed by Huntley and Hamilton, each with 46.0°, in the Yellowstone and Bitter Root Valleys, respectively. Elevated stations in the mountain sections show the lowest mean annual temperatures, as would be expected. It is desired to mention the fact that periods of beautiful exhilarating weather are characteristic of Montana's climate in winter as well as in summer and fall.

A general impression of the annual thermal distribution in Montana is more easily gained from the accompanying temperature chart than from a long descriptive effort. The reader is referred to the table and to the chart, and it is suggested that he apply to the United States Weather Bureau, Helena, for any specific information along climatic lines not herein set forth.

Monthly and Annual Temperature Normals for Central Division.

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Ann'l
Adel	21.0	22.5	29.0	40.1	47.5	55.6	62.5	60.2	52.2	43.0	33.3	24.4	40.9
Agricultural Col.	19.5	22.0	29.9	40.2	49.0	57.0	64.0	62.7	53.0	43.4	31.3	22.6	41.2
Augusta	19.0	21.8	30.9	41.9	49.3	56.5	62.6	60.9	53.2	44.5	32.2	24.7	41.5
Babb	16.0	18.1	25.9	37.9	46.2	54.2	60.0	58.5	51.0	41.4	29.3	19.0	38.1
Big Ox	18.4	20.7	28.0	39.5	47.3	55.5	63.4	61.5	52.6	42.5	30.2	22.4	40.2
Big Timber	25.9	27.5	34.4	44.8	52.5	62.0	69.0	67.8	57.8	48.4	36.0	29.1	46.3
Brenner	17.0	20.2	25.5	33.5	42.4	51.7	59.7	57.8	49.3	38.1	27.6	19.3	36.8
Browning	16.5	18.6	27.0	38.5	46.9	55.4	61.0	59.2	51.4	41.9	29.6	19.8	38.8
Busteed	21.8	23.8	32.4	42.5	51.0	59.5	65.8	64.1	54.8	44.9	34.9	25.3	43.4
Canyon Ferry	18.1	21.6	32.7	44.8	53.1	61.1	68.0	66.3	56.1	45.2	32.0	22.4	43.4
Cascade	22.4	25.8	34.1	44.9	52.6	60.5	66.8	65.3	56.4	46.3	35.2	26.5	44.7
Chinook	12.1	13.7	26.9	43.8	54.0	63.2	69.1	66.0	56.6	44.8	30.4	19.8	41.7
Choteau	20.6	22.6	31.8	42.4	51.4	59.0	65.1	63.1	54.4	44.4	33.2	24.5	42.7
Conrad	19.0	21.7	30.6	41.7	51.2	58.7	65.4	63.3	53.8	44.7	33.0	22.5	42.1
Copper	...	...	...	...	...	...	...	...	...	...	...	...	...
Cut Bank	17.0	20.0	28.0	40.5	49.0	57.3	63.3	61.8	52.3	42.1	30.2	21.2	40.2
Denton	21.8	23.0	31.6	43.4	51.4	60.7	67.4	66.0	56.4	45.8	34.5	25.7	44.0
Dillon	23.2	26.4	33.2	42.2	50.3	58.0	63.7	61.8	54.2	45.1	35.0	25.7	43.2
Dunkirk	...	...	...	...	...	...	...	...	...	...	...	...	...

Fort Shaw	20.5	23.5	32.6	44.5	53.1	61.5	67.5	65.0	55.9	46.0	34.3	25.7	44.2
Geraldine	21.6	24.4	32.0	44.4	52.5	61.3	68.5	67.0	57.2	46.8	35.5	26.3	44.8
Goldbutte	13.7	16.9	27.3	40.6	49.6	59.1	64.8	62.9	53.7	42.6	30.4	18.2	40.6
Great Falls	23.6	25.2	33.1	45.7	53.6	61.8	68.6	66.6	56.9	47.0	35.5	27.6	45.4
Harlowton	19.1	21.5	29.5	40.6	48.9	57.4	63.0	61.3	51.8	42.4	31.3	22.5	40.8
Havre	12.9	13.6	27.1	43.7	53.4	62.0	68.3	65.4	56.4	44.5	31.2	20.4	41.6
Hebgen Dam	12.0	14.5	23.4	33.5	43.6	51.7	57.9	57.0	48.6	37.4	25.2	15.7	35.0
Helena	20.2	23.0	32.4	43.5	51.6	59.2	65.7	65.0	56.6	44.8	33.2	24.3	43.3
Highwood	...	...	...	...	...	...	...	...	...	...	...	...	...
Holter	23.1	25.8	34.0	44.5	52.0	60.6	67.1	66.0	56.8	47.2	36.3	27.5	45.1
Lewistown	21.2	22.9	30.1	42.1	50.2	58.5	65.6	63.8	54.0	45.0	33.4	24.6	42.6
Livingston	25.5	27.3	33.6	43.1	51.5	60.3	68.0	66.8	57.2	48.2	36.2	28.6	45.5
Lytle	17.1	19.9	30.0	43.0	52.0	60.9	67.7	65.9	55.8	45.4	33.9	23.1	42.9
Norris	24.9	27.0	33.2	42.1	50.5	59.6	67.6	66.1	55.7	46.6	36.2	26.3	44.6
Renova	24.2	26.5	34.0	43.6	51.1	59.1	65.4	63.8	54.9	45.7	35.2	25.3	44.1
Sun River Canyon	20.4	22.5	29.8	41.2	48.9	57.0	63.4	61.7	53.4	44.9	33.0	24.2	41.7
Three Forks	21.5	24.9	31.9	43.0	51.1	59.9	66.3	64.0	54.3	44.1	32.4	22.7	43.0
Utica	22.1	23.6	29.6	41.7	49.3	57.7	65.3	64.0	54.6	44.8	34.1	25.8	42.7
Valier	18.0	20.8	29.1	41.0	50.0	58.1	64.9	63.0	53.5	44.0	32.5	21.4	41.4
Virginia City	20.5	23.2	29.1	39.2	47.5	56.6	65.1	63.6	53.4	42.8	30.6	22.4	41.2
White Sulphur Spgs.	18.1	21.3	29.3	39.6	48.0	56.8	63.2	61.6	52.0	42.9	31.2	21.7	40.5

Monthly and Annual Temperature Normals for Eastern Division.

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Ann'l
Biddle	19.2	21.7	30.0	41.5	52.9	63.7	70.4	68.5	58.7	46.3	33.4	22.7	44.1
Billings	22.7	25.2	34.2	45.5	54.8	63.3	70.9	69.0	58.7	48.2	34.7	26.0	46.1
Bridger	21.7	24.4	33.4	44.8	53.5	63.2	68.9	67.2	56.8	45.5	34.2	24.0	44.8
Busby	17.3	19.3	30.3	43.8	53.0	62.2	68.9	67.4	57.4	45.4	32.1	21.2	43.2
Crow Agency	18.9	20.5	32.8	45.8	55.4	65.3	71.3	69.1	59.0	47.5	33.6	23.7	45.2
Culbertson	7.6	9.7	24.8	43.3	53.6	62.9	69.0	67.0	56.4	44.0	28.6	14.0	40.1
Ekalaka	16.8	18.5	29.0	42.1	52.8	63.7	70.6	68.7	58.9	46.6	33.5	21.8	43.6
Flatwillow	19.0	21.7	30.1	41.8	51.4	61.2	69.3	67.0	57.4	45.3	32.7	23.1	43.3
Forsyth	15.0	17.1	29.0	45.1	55.6	64.9	71.7	71.0	60.4	46.0	31.1	20.8	44.0
Foster	18.4	20.8	30.7	44.4	54.2	63.5	70.0	67.9	57.9	46.1	32.6	22.2	44.1
Glasgow	8.1	10.7	24.4	43.8	55 1	63.7	70.0	67.9	56.6	43.9	27.4	14.6	40.5
Glendive	13.5	14.6	27.2	45.0	55.9	65.8	72.4	70.3	59.0	46.5	31.0	19.3	43.4
Knowlton	14.0	17.0	27.1	42.6	53.7	65.0	71.4	69.9	60.0	46.2	32.0	20.2	43.3
Malta	9.2	12.2	26.0	43.7	54.0	63.7	70.0	67.8	56.8	44.6	29.1	16.0	41.1
Medicine Lake	5.4	7.5	22.1	40.9	51.8	61.3	67.6	65.3	54.8	42.0	25.8	12.7	38.1
Mildred	...	...	...	...	...	...	...	...	...	...	...	...	...
Miles City	14.5	16.8	28.6	44.7	56.7	66.0	72.9	71.5	61.2	46.5	30.9	21.0	44.3
Pine Grove	...	...	...	...	...	...	...	...	...	...	...	...	...
Plevna	14.8	16.9	27.0	42.6	52.9	63.4	70.3	68.3	58.0	45.1	33.0	19.0	42.6
Poplar	6.4	8.3	23.8	43.8	55.0	63.0	70.7	68.0	57.3	45.0	28.2	14.1	40.3
Red Lodge	18.8	20.9	27.9	38.3	46.0	55.8	61.7	60.8	51.6	41.5	31.4	22.8	39.8
Rock Springs	11.7	14.9	25.9	42.1	52.5	63.0	70.8	68.9	57.1	44.9	29.3	18.1	41.6
Savage	12.1	13.4	26.8	44.6	55.0	64.6	71.4	69.0	58.0	45.3	30.5	17.2	42.3
Sidney	10.2	12.2	25.5	44.1	54.8	63.5	70.0	67.8	56.4	44.5	29.1	16.0	41.2
Snowbelt	16.0	18.2	27.8	41.5	51.6	61.8	69.2	67.0	57.0	44.8	31.1	19.3	42.1
Springbrook	11.7	14.0	26.5	43.5	53.8	62.9	69.6	67.2	57.7	45.7	30.8	18.7	41.8
Valentine	17.4	19.4	29.5	42.0	51.7	62.3	69.5	67.1	57.0	45.3	32.0	19.6	42.7
Wheaton	20.3	22.2	30.7	41.6	50.4	60.0	67.7	65.7	56.1	45.0	33.1	23.8	43.0
White Water	8.6	11.6	24.5	41.3	51.2	60.6	66.7	64.6	54.0	41.5	27.0	14.9	38.9
Wibaux	13.8	15.9	27.2	43.5	54.2	63.4	69.3	67.2	57.2	44.5	31.2	17.5	42.1

Monthly and Annual Temperature Normals for West of Divide.

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Ann'l
Anaconda	23.4	24.9	31.4	40.6	48.2	55.9	63.6	62.3	53.2	44.3	33.7	24.9	42.2
Belton	19.5	22.0	30.8	41.5	48.5	56.2	63.0	61.7	52.6	42.5	30.5	22.9	41.0
Butte	23.5	24.9	31.3	40.5	48.2	57.0	64.8	63.1	53.5	44.0	33.1	24.5	42.4
Columbia Falls	20.5	23.5	32.7	43.2	51.3	58.1	64.7	63.2	54.0	43.6	32.3	24.6	42.6
Dayton	23.6	26.5	33.8	43.8	51.2	58.7	65.6	64.2	55.3	45.2	34.3	26.3	44.0
East Anaconda	22.7	23.9	29.6	39.4	47.4	56.5	64.4	62.9	53.3	43.8	33.4	24.6	41.8
Fortine	18.9	23.1	32.6	42.3	49.7	57.3	62.7	61.0	52.1	42.5	31.0	22.1	41.3
Hamilton	25.0	28.6	37.2	45.8	53.3	60.9	66.7	64.8	56.6	46.8	35.5	26.9	45.7
Haugan	20.9	24.6	33.6	42,6	49.8	57.0	63.0	60.9	53.3	43.5	32.8	23.9	42.2
Heron	24.0	26.6	35.1	44.2	51.1	58.4	64.0	62.5	54.2	44.7	34.1	25.0	43.7
Kalispell	20.4	23.3	32.9	43.6	51.4	57.7	64.1	62.8	53.5	43.5	32.4	24.9	42.5
Libby	23.0	26.6	35.8	45.9	53.5	59.5	65.0	63.5	55.2	45.4	34.0	24.9	44.4
Missoula	22.1	25.9	35.0	44.7	52.4	59.5	66.9	65.3	55.7	44.8	33.1	24.5	44.2
Ovando	17.1	20.3	28.9	39.3	47.7	55.2	61.4	59.8	51.3	41.2	29.6	19.7	39.3
Phillipsburg	21.4	24.3	31.5	40.6	48.2	55.4	62.3	60.8	52.8	43.1	32.2	23.4	41.3
Plains	25.0	28.0	36.7	45.3	52.3	59.3	66.6	65.0	56.0	46.1	34.9	26.4	45.1
Pleasant Valley	16.9	20.5	29.2	40.4	48.5	55.4	59.7	57.0	49.6	39.7	30.0	21.6	39.0
Polson	24.5	27.2	35.1	44.7	52.0	60.2	67.8	66.4	56.0	46.4	34.6	26.9	45.2
St. Ignatius	24.0	27.0	35.5	45.6	52.3	59.5	66.3	64.5	55.3	45.7	34.1	25.6	44.6
Stevensville	23.8	26.3	34.7	44.0	51.1	58.6	64.7	63.7	54.7	44.4	33.4	25.0	43.7
Sunset Orchard	24.0	26.7	34.9	43.4	50.9	58.0	64.5	63.4	54.7	44.5	33.8	25.6	43.7
Superior	23.9	27.6	35.6	44.4	51.0	57.8	64.9	63.3	55.2	44.6	33.5	25.2	43.9
Thompson Falls	24.5	27.3	35.7	44.7	51.6	59.1	65.9	64.3	56.3	46.0	34.3	26.8	44.7
Trout Creek	24.2	27.0	35.3	44.5	50.0	56.5	62.6	60.0	53.0	44.0	33.9	25.1	43.0
Upper Yaak River	18.6	23.2	31.5	41.0	49.3	56.6	61.7	60.0	51.8	42.3	30.3	20.8	40.6
Victor	23.9	26.3	34.3	43.8	51.3	58.8	64.6	63.1	54.7	45.0	33.6	25.5	43.7

Rainfall and snowfall also vary greatly from year to year and from month to month of the same year. Over nearly all the State the greatest amount of precipitation comes in the form of rain and in the months of May and June, when its beneficial effects upon crop growth and grass are at a maximum, corresponding to the need. Exceptions to this rule are practically confined to a small portion in the northwestern corner of the State, where the precipitation maximum occurs in the winter with a second maximum in the early part of the growing season. The average total annual precipitation for Montana for the last 33 years is 15.9 inches; the greatest annual total was 20.6 inches in 1927, and the least annual total, 11.04 inches in 1904.

Because of the extent and topographical variety of Montana it seems futile to try to give an adequate description of the varying distribution of precipitation over the State. It seems better to present it in tabular form by months. The table is clear and can readily be interpreted by anyone interested who knows or will learn the location of the points tabulated. A chart herewith shows the average annual distribution, but it is impracticable to give it in chart form for each month.

On the back page of this book there will be found a large map of the State, with an index and localities may thus be easily located.

The snowfall is lightest over the plains and heaviest over the mountain regions of the western and southwestern portions, where it provides a reserve of moisture which, except following winters of less than normal snowfall, keeps the streams up in the growing season and supplies water for irrigating purposes to supplement the moisture falling as rain and the small amounts deposited as dew in the cool mornings.

Monthly and Annual Precipitation Normals for Central Division.

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Ann'l
Adel	1.33	1.24	1.80	2.17	3.61	4.00	2.03	1.71	2.25	1.97	1.08	1.33	24.52
Agricultural Col.	0.85	0.81	1.24	1.71	3.41	2.97	1.31	1.02	1.71	1.35	0.97	1.00	18.35
Augusta	0.64	0.50	0.90	1.13	2.68	3.02	1.83	1.21	1.44	0.86	0.52	0.53	15.26
Babb	1.26	0.90	1.21	1.72	2.50	3.17	2.17	2.03	1.92	1.10	0.92	1.00	19.90
Big Ox	1.54	1.30	1.50	1.22	2.79	2.87	1.63	1.20	1.43	1.20	1.58	1.41	19.67
Big Timber	0.65	0.56	0.90	1.36	2.77	2.12	1.55	1.09	1.64	1.39	0.87	0.46	15.36
Brenner	0.60	0.50	0.77	1.24	1.38	1.41	1.05	0.78	1.05	0.78	0.66	0.75	10.97
Browning	0.86	0.70	0.90	1.04	2.30	2.61	1.60	1.41	1.68	0.79	0.85	0.71	15.45
Busteed	0.67	0.46	0.82	1.21	2.70	2.11	1.60	1.14	1.71	1.30	0.61	0.52	14.85
Canyon Ferry	0.57	0.45	0.48	0.74	2.20	2.21	1.29	0.94	1.19	0.76	0.40	0.38	11.61
Cascade	0.69	0.70	0.76	1.50	3.02	3.68	1.60	1.23	1.59	1.36	0.62	0.67	17.42
Chinook	0.61	0.38	0.43	0.91	2.05	2.81	1.73	1.14	1.05	0.45	0.65	0.47	12.68
Choteau	0.70	0.58	0.66	0.85	2.04	2.96	1.70	1.30	0.98	0.76	0.32	0.54	13.39
Conrad	0.47	0.30	0.46	0.83	1.69	2.50	1.65	1.38	1.10	0.65	0.24	0.51	11.78
Copper	0.90	0.67	0.93	1.08	2.53	3.03	1.88	1.22	1.64	1.12	0.78	0.75	16.53
Cut Bank	0.43	0.34	0.35	0.65	1.65	2.43	1.84	1.32	1.05	0.47	0.18	0.28	10.99
Denton	0.66	0.45	0.65	1.00	1.82	3.41	1.92	1.09	1.30	0.86	0.40	0.52	14.08
Dillon	0.90	0.77	1.37	1.90	3.22	2.56	1.51	1.23	1.49	0.95	0.87	0.81	17.58
Dunkirk	0.48	0.33	0.39	0.70	1.75	2.45	1.89	1.46	1.10	0.53	0.20	0.39	11.67
Fort Shaw	0.51	0.42	0.42	0.69	1.89	2.27	1.36	0.98	0.93	0.68	0.34	0.46	10.95
Geraldine	0.83	0.71	0.91	1.49	2.70	3.25	2.00	1.28	1.50	1.17	0.74	0.80	17.38
Goldbutte	0.60	0.44	0.38	0.63	1.73	2.93	1.60	1.33	1.19	0.55	0.34	0.40	12.12
Great Falls	0.67	0.59	0.83	1.26	2.45	3.40	1.66	1.07	1.37	0.88	0.72	0.64	15.54
Harlowton	0.71	0.61	0.80	1.26	2.30	2.40	1.65	0.74	1.17	0.70	0.56	0.47	13.37
Havre	0.69	0.47	0.48	1.01	2.09	2.82	1.92	1.26	1.03	0.50	0.77	0.63	13.67
Hebgen Dam	2.21	1.55	1.51	1.40	2.35	2.01	1.93	1.23	1.67	1.57	1.18	1.75	20.36
Helena	0.93	0.74	0.74	1.14	1.95	2.11	1.07	0.69	1.06	0.82	0.72	0.80	12 77
Highwood	0.88	0.83	0.92	1.48	2.65	3.71	2.14	1.36	1.90	1.50	0.82	0.98	19.17
Helter	0.62	0.67	0.63	1.15	2.42	2.79	1.40	0.99	1.41	1.15	0.51	0.54	14.28
Lewistown	0.77	0.77	1.04	1.37	2.76	3.70	2.13	1.25	1.50	1.10	0.74	0.71	17.84
Livingston	0.56	0.56	0.87	1.43	3.05	1.87	1.37	0.98	1.55	1.25	0.87	0.51	14.87
Lytle	0.60	0.58	0.55	0.91	1.85	2.24	1.45	1.37	1.06	0.74	0.41	0.50	12.26
Norris	0.53	0.58	1.03	1.54	3.21	2.65	1.32	1.10	1.51	1.29	0.78	0.57	16.11
Renova	0.52	0.43	0.55	1.34	2.13	2.12	1.19	0.91	1.27	0.90	0.44	0.31	12.11
Sun River Canyon	0.90	0.67	0.95	1.23	2.78	3.02	1.94	1.30	1.52	1.24	0.77	0.91	17.23
Three Forks	0.45	0.39	0.45	1.04	1.91	2.50	1.11	0.74	1.22	0.81	0.50	0.48	11.60
Utica	0.64	0.42	0.82	1.18	2.75	3.48	2.10	1.21	1.35	1.10	0.78	0.58	16.41
Valier	0.44	0.30	0.40	0.77	1.67	2.50	1.85	1.50	1.13	0.70	0.24	0.47	11.97
Virginia City	0.58	0.53	0.99	1.23	2.60	2.10	1.27	1.15	1.37	0.89	0.84	0.74	14.29
White Sulphur Spgs.	0.48	0.40	0.80	0.95	2.05	2.40	1.56	0.93	1.18	0.69	0.43	0.50	12.37

Monthly and Annual Precipitation Normals for Eastern Division.

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Ann'l
Biddle	0.45	0.35	0.62	1.27	2.51	3.02	2.15	1.64	1.61	0.99	0.47	0.32	15.40
Billings	0.67	0.40	0.82	1.20	2.74	2.36	1.32	0.96	1.23	1.24	0.77	0.45	14.16
Bridger	0.23	0.24	0.54	0.95	1.85	1.50	0.70	0.64	1.56	1.17	0.31	0.35	10.04
Busby	0.74	0.51	0.80	1.13	2.35	2.38	1.42	0.95	1.30	1.08	0.57	0.65	13.88

Crow Agency	0.78	0.64	0.97	1.37	2.47	2.71	1.35	0.85	1.11	1.26	0.78	0.73	15.02
Culbertson	0.56	0.42	0.60	0.94	2.14	2.90	2.02	1.37	1.10	0.72	0.50	0.37	13.64
Ekalaka	0.50	0.41	0.64	1.06	2.22	2.82	1.71	1.56	1.34	0.82	0.29	0.29	13.66
Flatwillow	0.54	0.43	0.58	0.70	2.17	3.12	1.50	1.04	1.01	0.85	0.42	0.54	12.90
Forsyth	0.64	0.50	0.68	1.16	2.10	2.40	1.40	0.95	1.05	0.85	0.60	0.40	12.73
Foster	0.49	0.46	0.65	0.98	2.10	2.44	1.43	0.80	1.17	0.96	0.60	0.34	12.42
Glasgow	0.59	0.50	0.85	0.96	2.35	2.91	1.46	1.23	1.01	0.73	0.48	0.54	13.61
Glendive	0.59	0.52	0.90	1.14	2.28	3.20	1.79	1.35	1.33	0.90	0.53	0.59	15.12
Knowlton	0.70	0.60	0.75	1.14	2.12	3.10	1.85	1.19	1.15	0.95	0.65	0.60	14.80
Malta	0.59	0.43	0.53	0.82	2.18	3.82	1.90	1.23	1.04	0.57	0.36	0.41	13.88
Medicine Lake	0.53	0.43	0.51	0.90	1.73	3.14	1.87	1.30	1.22	0.86	0.43	0.40	13.32
Mildred	0.40	0.35	0.70	1.16	2.19	3.17	1.79	1.27	1.34	0.85	0.45	0.35	14.02
Miles City	0.62	0.56	0.76	1.18	1.98	2.77	1.37	1.03	0.92	0.78	0.60	0.62	13.19
Pine Grove	1.19	0.72	1.33	1.50	3.02	3.80	2.50	1.46	1.60	1.10	0.61	0.97	19.80
Plevna	0.57	0.48	0.66	1.16	2.05	3.03	1.97	1.19	1.13	0.94	0.47	0.42	14.07
Poplar	0.58	0.44	0.76	0.91	1.85	3.09	1.79	1.15	0.92	0.68	0.65	0.43	13.25
Red Lodge	0.77	0.78	1.51	2.53	3.50	2.31	1.42	1.12	2.15	1.77	0.72	0.70	19.28
Rock Springs	1.13	0.66	0.84	1.14	1.73	2.94	1.25	1.20	1.00	0.70	0.66	0.70	13.95
Savage	0.54	0.44	0.61	1.04	2.22	3.11	1.80	1.38	1.30	0.87	0.46	0.55	14.32
Sidney	0.56	0.44	0.56	1.02	2.22	3.00	1.83	1.37	1.18	0.83	0.45	0.50	13.96
Snowbelt	0.59	0.48	0.75	1.02	2.41	3.56	2.00	1.27	1.23	1.02	0.55	0.80	15.68
Springbrook	0.97	0.91	1.22	1.21	2.42	3.80	1.85	1.78	1.30	1.06	0.74	1.03	18.29
Valentine	0.51	0.38	0.55	0.80	2.18	3.00	1.58	1.19	0.95	0.72	0.31	0.40	12.57
Wheaton	0.73	0.66	0.93	1.11	2.37	3.31	1.85	1.20	1.28	0.80	0.55	0.63	15.42
White Water	0.42	0.41	0.49	0.77	1.97	3.37	1.85	1.40	1.00	0.51	0.32	0.37	12.88
Wibaux	0.55	0.50	0.75	1.18	2.16	3.60	1.94	1.40	1.27	0.85	0.55	0.40	15.15

Monthly and Annual Precipitation Normals for West of Divide.

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Ann'l
Anaconda	0.90	0.68	0.87	0.98	2.06	2.20	1.34	0.96	1.21	0.89	0.88	0.77	13.74
Belton	3.10	2.14	1.86	1.46	2.26	3.10	1.70	1.76	2.40	2.60	2.87	3.20	28.45
Butte	0.84	0.78	1.05	1.16	2.03	2.18	1.27	0.92	1.11	0.93	0.81	0.79	13.87
Columbia Falls	2.00	1.61	1.18	1.23	2.56	2.91	1.51	1.48	1.93	1.43	2.01	1.99	21.84
Dayton	1.03	0.77	0.85	0.95	1.80	2.09	1.40	1.15	1.25	1.03	1.65	1.50	15.47
East Anaconda	0.97	0.71	0.90	1.09	2.12	2.26	1.33	0.97	1.13	0.84	0.85	0.74	13.91
Fortine	1.65	1.20	1.23	0.97	1.81	2.39	1.41	1.25	1.43	1.09	1.61	1.42	17.46
Hamilton	0.87	0.68	0.79	0.97	1.64	1.73	0.92	0.78	1.11	0.95	1.00	0.80	12.24
Haugan	4.19	2.39	2.50	1.56	1.63	1.81	1.00	0.91	1.57	2.11	3.64	4.10	27.41
Heron	4.02	2.87	3.33	2.20	2.00	1.90	1.40	1.20	1.90	2.37	3.94	4.52	31.65
Kalispell	1.59	1.46	1.08	1.06	2.03	1.74	0.84	0.89	1.33	1.17	1.90	1.85	16.94
Libby	2.51	1.61	1.59	1.06	1.55	1.60	1.15	0.98	1.44	1.57	3.23	2.41	20.70
Missoula	1.34	0.87	1.03	1.05	2.07	2.08	1.08	0.90	1.27	1.20	1.19	1.40	15.48
Ovando	1.74	1.47	1.20	1.04	2.15	2.31	1.20	1.12	1.32	1.23	1.63	1.81	18.22
Philipsburg	0.68	0.68	0.99	1.27	2.28	2.82	1.41	1.00	1.44	1.12	0.91	0.58	15.18
Plains	1.22	0.93	0.86	0.73	1.82	1.66	1.14	0.90	1.22	0.91	1.52	1.60	14.51
Pleasant Valley	1.90	1.46	1.50	1.01	1.78	1.86	1.00	0.99	1.67	1.16	2.50	2.00	18.83
Polson	1.01	0.80	0.94	1.20	1.68	2.22	1.31	1.10	1.42	1.16	1.42	1.29	15.55
St. Ignatius	0.94	0.82	0.95	1.22	2.28	2.38	1.28	1.05	1.53	1.27	1.23	1.20	16.15
Stevensville	0.99	0.72	0.65	0.80	1.59	1.74	0.94	0.89	1.29	0.96	1.05	0.95	12.57
Sunset Orchard	1.00	0.74	0.72	0.90	1.82	1.71	0.95	0.95	1.25	0.82	1.11	0.72	12.69
Superior	1.30	1.15	1.40	1.14	1.81	1.71	1.10	1.02	1.33	1.06	1.61	2.03	16.66
Thompson Falls	2.49	1.40	1.81	1.40	1.83	1.70	1.32	0.95	1.35	1.52	2.24	2.34	20.35
Trout Creek	3.80	2.85	3.10	1.61	1.90	1.76	1.33	0.95	1.49	1.96	3.50	4.15	28.40
Upper Yaak River	1.97	1.51	1.65	1.51	1.64	1.63	1.03	1.13	1.68	1.78	2.02	2.37	19.92
Victor	1.11	0.76	0.78	1.20	1.60	1.60	0.83	0.94	1.16	0.90	1.30	1.36	13.54

Another climatic element exhibiting much difference over the State is the length of the season between the last killing frost of spring and the first killing frost of autumn. It depends upon how far the points examined are separated north and south of each other (for a north and south line can be drawn for 275 miles across Montana) and upon whether they lie on the plains, in the valleys, on the benches, or in the mountains. The longest killing frost free seasons are, in general, those of the plains sections.

Frost Data for Montana

Station—Counties	Length of Record Years	Average Date last killing frost in Spring	Average Date first killing frost in Autumn
Adel, Cascade	23	June 12	Sept. 1
Agricultural College, Gallatin	28	May 22	Sept. 12
Anaconda, Deer Lodge	21	June 10	Sept. 11
Augusta, Lewis and Clark	22	June 4	Sept. 4
Biddle, Powder River	14	May 23	Sept. 18
Big Timber, Sweet Grass	15	May 23	Sept. 14
Billings, Yellowstone	26	May 16	Sept. 28
Bowen, Beaverhead	15	**	**

Brenner, Beaverhead	8	June 14	Sept. 12
Browning, Glacier	12	June 16	Sept. 2
Butte, Silver Bow	28	May 29	Sept. 18
Cascade, Cascade	17	May 19	Sept. 17
Chester, Liberty	17	May 25	Sept. 7
Chinook, Blaine	25	May 14	Sept. 18
Choteau, Teton	14	May 25	Sept. 14
Circle (near), McCone	20	May 28	Sept. 16
Crow Agency, Big Horn	40	May 14	Sept. 26
Cut Bank, Glacier	13	May 21	Sept. 13
Deer Lodge, Powell	16	June 11	Sept. 6
Denton, Fergus	13	May 17	Sept. 23
Dillon, Beaverhead	23	June 1	Sept. 5
Ekalaka, Carter	20	May 25	Sept. 22
Findon, Meagher	9	May 28	Sept. 18
Fort Benton, Chouteau	28	May 11	Sept. 23
Fortine, Lincoln	15	June 13	Aug. 26
Fort Shaw Cascade	21	May 19	Sept. 18
Glasgow, Valley	26	May 21	Sept. 17
Glendive, Dawson	32	May 14	Sept. 22
Goldbutte, Toole	14	May 29	Sept. 14
Great Falls, Cascade	29	May 8	Sept. 24
Hamilton, Ravalli	22	May 17	Sept. 23
Harlowton, Wheatland	17	June 7	Sept. 4
Haugan, Mineral	14	June 14	Aug. 28
Havre, Hill	40	May 16	Sept. 19
Hebgen Dam, Madison	18	July 3	Aug. 15
Helena, Lewis and Clark	42	May 9	Sept. 28
Heron, Sanders	10	May 29	Sept. 3
Holter, Lewis and Clark	19	May 19	Sept. 17
Jordan, Garfield	14	May 19	Sept. 19
Kalispell, Flathead	23	May 5	Oct. 2
Lewistown, Fergus	22	May 29	Sept. 7
Libby, Lincoln	27	June 6	Sept. 6
Livingston, Park	20	May 18	Sept. 19
Malta, Phillips	15	May 21	Sept. 25
Medicine Lake, Sheridan	11	May 23	Sept. 15
Miles City, Custer	29	May 5	Oct. 2
Missoula, Missoula	31	May 23	Sept. 18
Ovando, Powell	22	June 19	Aug. 16
Philipsburg, Granite	17	June 14	Aug. 29
Plevna, Fallon	9	May 23	Sept. 26
Polson, Lake	15	May 13	Sept. 28
Poplar, Roosevelt	36	May 15	Sept. 16
Red Lodge, Carbon	22	June 8	Sept. 4
Renova, Jefferson	24	May 26	Sept. 9
Roundup, Musselshell	7	May 17	Sept. 30
St. Ignatius, Lake	17	May 22	Sept. 20
Shelby, Toole	10	May 27	Sept. 14
Sidney, Richland	16	May 20	Sept. 22
Snowbelt (near), Garfield	7	May 16	Oct. 2
Stevensville, Ravalli	11	May 22	Sept. 21
Superior, Mineral	7	June 7	Sept. 7
Thompson Falls, Sanders	11	May 20	Sept. 22
Three Forks, Gallatin	19	June 1	Sept. 9
Upper Yaak River, Lincoln	8	June 13	Aug. 29
Utica, Judith Basin	28	May 26	Sept. 18
Valentine, Fergus	15	May 21	Sept. 16
Valier, Pondera	10	May 21	Sept. 28
Virginia City, Madison	18	June 2	Sept. 19
White Sulphur Springs, Meagher	14	June 2	Sept. 4
White Water, Phillips	7	May 30	Sept. 15

**Freezing temperature often occurs every month.

The Weather of 1927.

Average precipitation in Montana for 1927 was 20.63 inches, which is more than is entered for any year since the beginning in 1895 of records sufficiently comprehensive to cover the State, and this notwithstanding the fact that the rainfall of June, normally the month of greatest precipitation, was seven-tenths of an inch less than normal. The average for June, 1927, however, was nearly two inches, which was quite sufficient in most sections, following extraordinarily heavy precipitation in May amounting to over five inches on the average. Three months of the year, January, March, and June received less than the normal amount of moisture. This was the second June in succession below normal, immediately preceded by three consecutive Junes above normal for the State as a whole.

Stations west of the Continental Divide averaged 24.45 inches for the year. Dividing into two approximately equal portions that part of the State lying east of the Divide, the eastern division averaged 18.48 inches, while the other averaged 20.26 inches and included both the highest and the lowest station in the annual amounts. Totals at individual stations varied from 43.03 inches at Adel, southern Cascade County; downward to 8.74 inches at Ennis, Madison County, more than two inches less than the next lowest, and the only station reporting less than ten inches. Haugen, Heron, and Trout Creek, in the extreme west, each totalled more than 40 inches.

It was a year of heavy snowfall, with an average of 73.0 inches. Two stations exceeded 200 inches of snow for the year,—Adel, with 227 inches, and Mystic Lake, southern Stillwater County with 206.1 inches. Twelve other stations had more than 100 inches. The lightest snow totals, as a rule—and as usual, were in the eastern portion, where an average of 41.4 inches per station fell.

The accumulated departure in temperature from January 1 to November 30 was only 0.4 degree below normal, but a record-breaking cold December followed. As a result the record of annual mean or average temperatures shows but three years cooler than 1927. Aside from the extraordinary December, the most notable months were May for coolness, with a mean of 46.7 degrees (this being a very wet month), and October for pleasant warmth, with a mean of 47.6 degrees.

Extremes of temperature recorded in the State during the year were 104 degrees, at Bridger, Carbon County, on July 9; and —51 degrees, at Kenilworth, northern Chouteau County, on the last day—and coldest day generally—of the year. The mean temperature for the State for July, the warmest month, was 65.5 degrees; and for December, this year the coldest, it was 9.6 degrees. The normal for December is 22.5 degrees, and a departure as great as 9.6 degrees is quite unusual for any month.

With an average temperature of 44.3 degrees for the year the Yellowstone Valley, from Miles City westward, was the warmest section of the State, and the Livingston mean temperature, 45.9, was the highest of all stations reporting. The valley of the Clark Fork of the Columbia was but little lower than the Yellowstone Valley in annual mean temperature.

As would be expected in a year in which a new record for heavy precipitation was set, the number of cloudy days (122) also establishes a new high mark.

Condensed State Summary for the Year, 1927

Months	Temperature, in degrees Fahrenheit				Precipitation, in inches			Average number of days				Prevailing direction of the wind
	Mean	Departure from the normal	Highest	Lowest	Average	Departure from the normal	Greatest local amount	Precip. (0.01 inch or more)	Clear	Partly cloudy	Cloudy	
January	18.7	+ 0.2	61	—48	0.88	—0.06	5.00	7	10	8	13	sw.
February	22.7	+ 1.6	60	—36	0.87	+0.14	6.37	7	8	9	11	sw.
March	32.9	+ 2.7	75	—18	0.61	—0.30	2.49	5	12	11	8	w.
April	40.6	— 1.8	89	— 5	1.20	+0.05	4.52	8	11	9	10	w.
May	46.7	— 4.2	88	7	5.15	+2.92	10.82	16	5	9	17	w.
June	59.5	+ 0.1	103	24	1.91	—0.70	4.82	10	13	11	6	w.
July	65.5	— 0.7	104	27	1.68	+0.06	5.17	7	19	8	4	w.
August	62.5	— 1.9	98	23	2.04	+0.89	8 02	9	13	12	6	w.
September	54.1	— 0 9	99	17	1 69	+0.31	5.82	8	13	8	9	w.
October	47 6	+ 3.3	92	6	1.22	+0.21	5.56	7	14	9	8	w.
November	29.2	— 3.0	74	—20	2.24	+1.34	10.01	12	4	8	18	sw.
December	9.6	—12.9	62	—51	1.14	+0.25	4.59	9	11	8	12	w.
Annual	40.8	— 1.5	104	—51	20.63	+5.11	10.82	105	133	110	122	w.

Comparative Annual Data for the State.

Year	Temperature			Precipitation				Number of days				Prevailing direction of wind
	State mean	Highest	Lowest	State average	Greatest annual	Least annual	Average snowfall	With 0.01 inch or more precipitation	Clear	Partly cloudy	Cloudy	
1895	42.1	107	—57	12.97	22.57	6.73	50.9	.....	.....	.....	.....	.....
1896	42.4	111	—42	17.50	26.28	8.51	62.8	71	.....	.....	.....	.....
1897	42.2	105	—46	15.71	29.31	7.60	54.8	70	154	128	83	sw.
1898	41.6	105	—37	16.82	27.18	9.88	52.2	78	152	126	87	sw.
1899	40.5	103	—61	15.28	25.61	5.25	66.8	84	145	116	104	sw.
1900	44.4	113	—43	13.34	27.25	7.24	33.1	68	163	113	89	sw.
1901	44.3	112	—34	15.08	22.83	6.90	43.7	76	165	119	81	sw.
1902	42.0	102	—38	15.26	32.03	9.03	42.5	72	154	112	99	sw.
1903	42.2	105	—45	15.03	22.31	8.77	61.4	75	172	98	95	w.
1904	43.5	111	—42	11.04	23.11	6.23	52.1	63	170	106	90	sw.
1905	43.1	104	—60	14.38	25.26	6.76	46.1	71	169	101	95	w.
1906	44.0	109	—45	18.47	34.20	9.60	43.1	76	176	93	96	w.
1907	41.8	105	—48	17.00	49.13	8.30	50.9	80	165	101	99	w.
1908	43.6	109	—55	20.09	61.81	9.47	57.5	79	174	95	97	w.
1909	41.8	108	—55	19.57	79.95	8.12	68.2	84	163	101	101	w.
1910	44.7	112	—49	15.99	58.62	6.07	55.1	69	178	104	83	w.
1911	40.5	106	—46	18.50	38.55	7.82	74.6	90	160	108	97	w.
1912	41.9	102	—51	17.39	38.11	8.55	57.9	85	152	108	106	w.
1913	41.9	102	—48	15.28	30.06	7.68	57.5	81	166	109	90	w.
1914	43.7	107	—54	15.06	32.02	8.07	48.3	77	155	120	90	w.
1915	43.2	102	—47	18.71	31.86	10.87	41.6	89	143	120	102	w.
1916	39.4	104	—58	13.72	38.94	9.49	79.0	88	163	112	91	w.
1917	41.6	110	—47	14.44	36.74	6.35	73.6	77	173	98	94	w.
1918	43.7	110	—51	13.78	31.65	6.18	49.0	77	160	105	100	w.
1919	42.6	109	—52	11.14	28.96	4.54	63.5	68	180	99	86	w.
1920	42.6	106	—45	14.59	28.04	7.11	42.6	84	165	95	106	w.
1921	44.2	110	—42	14.64	33.36	7.20	55.7	79	168	98	99	w.
1922	41.5	104	—46	15.12	33.72	9.54	62.7	78	171	95	99	w.
1923	43.4	107	—53	18.12	39.74	9.66	46.4	85	163	102	100	w.
1924	41.8	110	—55	13.71	29.74	5.52	55.6	82	157	97	112	w.
1925	44.6	110	—46	16.34	38.05	9.07	49.8	85	150	104	111	w.
1926	44.7	110	—36	13.79	35.01	7.27	45.8	75	156	108	101	w.
1927	40.8	104	—51	20.63	43.03	8.74	73.0	105	133	110	122	w.

AN ORCHARD IN THE BITTER ROOT VALLEY

TRANSPORTATION IN MONTANA

From the Dog Travois to the Air Mail in Seventy-Five Years—Seven Thousand Miles of Steel Rails in 1928—Eighteen Marked Trails.

Interesting and varied is the history of transportation in the Treasure State. The fur traders, the earliest white men to come to Montana, came up the Missouri in keel boats, dugouts and steamboats. Travel by land can be traced back to the dog travois used by the Indians. Dog-drawn sleds were used to haul the valuable fur catches overland to the trading posts. The oxcart made entirely of wood, came with the miner. The caravan of pack horses was the freight train of the earliest settler. Next came the covered wagon era and a little later, the stage coach. The stage coach was used in Montana as late as 1887. The first steel rails were laid by the Utah and Northern railway to Red Lake, Montana, early in 1880.

The traveler in Montana today is offered three modern means of transportation. He may ride in the coaches of a fast transcontinental railway; go by car or bus over improved highways, or travel in the air with the United States air mail service or in a privately owned plane.

Air Ways.

Establishment of a U. S. air mail route from Salt Lake City to Great Falls with stops at Butte, Helena and Pocatello, Idaho, the latter part of June, 1928, greatly increased Montana's interest in aviation.

Although there are only three Montana cities on the line of the air mail, Billings, Livingston, Bozeman, Missoula, Deer Lodge, Anaconda, and cities on the Great Northern north of Great Falls, are much benefitted in sending mail, due to the fact that train connections enable them to get their mail to Great Falls or Butte and Helena in plenty of time to catch the morning plane to Salt Lake. The route brings Great Falls within 19 hours of Chicago and 27 hours of New York.

Four super Fokker Universal planes constitute the initial equipment of the Parks Airways corporation in the air mail service. Each plane has a cabin capacity of six passengers in addition to the mail and pilot. The planes have a cruising speed of 110 miles an hour with a high speed of 140 miles. A schedule of five hours is maintained between the southern and northern ends of the route including stops at intermediate points. The planes were built at a cost of $18,000 each or $75,000 for the four.

The national Parks Airways will maintain aerial service out of Montana points to both the national parks, opening the glory of Glacier and the Yellowstone to sight seekers from the air.

At many points in the state airplanes had been operating before the arrival of the air mail, but with the announcement of the Salt Lake-Great Falls line by the National Parks Airways Corporation, the entire state took a renewed interest in air travel and many cities established air ports to encourage aviation.

The following cities had established air ports by June, 1928: Helena, Missoula, Kalispell, Polson, Butte, Anaconda, Sidney, Scobey, Froid, Wolf Point, Glasgow, Havre, Shelby, Great Falls, and Fort Benton.

Passenger planes operate at Scobey, Sidney, Miles City, Billings, Livingston, Butte, Dillon, Missoula, Great Falls, Helena, Plains, Moore, Harlowton, Belgrade and Ekalaka.

Flying schools are established at Helena, Belgrade, Miles City, Harlowton, Butte, Great Falls, and other points.

Busses.

Bus lines now serve 2,824 miles of Montana highway. There are 78 permits from the Montana Railroad Commission now in effect, issued to companies who operate a total of 137 cars carrying both freight and passengers in the state.

Twenty-nine companies are licensed to carry freight only; 24 for passengers

MALTA BUSINESS SECTION. A TOWN OF 1,427 PEOPLE WITH SEVERAL VERY SUBSTANTIAL STORES, BANKS AND PUBLIC BUILDINGS. TWO BANKS IN DECEMBER, 1927, HAD RESOURCES OF $1,714,275.74, A GAIN OF $163,105.67 SINCE OCTOBER. ON GREAT NORTHERN MAIN LINE.

ONE OF MONTANA'S FIVE THOUSAND FLOCKS

A FEW SHEEP MEN STILL USE TEAMS TO HAUL WOOL TO THE RAILROADS. EACH BAG WEIGHS 250 POUNDS OR MORE

only, and 25 for passengers and express. The freight lines run 50 cars over 957 miles of highway; the passenger lines, 42 cars over 142 miles of highway, and the lines serving both purposes have 45 cars operating over 1,763 miles.

Generally the busses operate as feeder lines to the railroads, in fact the bus mileage is something of an indication of the additional railway mileage that some day will be built in the state as development increases.

Railroads.

As late as 1879 no beginning had been made in railroad construction in Montana; in 1894 there were 2,735 miles of rail; in 1907, 3,307 miles; in 1909, 4,342 miles; in 1926, 6,963 miles.

Three new rail projects completed in 1928 add 143 miles to rail systems in Montana making the total mileage 7,100.

During the summer of 1928 the Northern Pacific built into east central Montana from Glendive in Dawson county to Brockway in McCone county opening up the rich agricultural lands of the Redwater valley. This company also constructed 25 miles of new track on the east side of the Bitter Root river between Hamilton and Florence. The Redwater extension entailed an expenditure of $3,000,000, the Bitter Root branch about $1,500,000.

The third project, the Saco-Turner branch of the Great Northern, extends 75 miles into Phillips and Blaine counties, starting at Saco, Phillips county. In the fall of 1926 the branch extending from Bainville north through Roosevelt and Sheridan counties and west into Valley county was completed to Opheim, so that there are now two branch lines extending into the vast farming area of northeastern Montana. The Saco-Turner line was built at a cost of about $2,000,000.

Water Transportation.

A fourth channel for traffic in Montana may be added to the above systems if water transportation is restored to the Upper Missouri river, a venture thought by some to be practical by the use of barges in place of the early day steamboats. Another project of interest to transportation students is the Great Lakes—St. Lawrence waterway, which will place Montana much closer to the Atlantic seaboards, making possible greatly reduced freight rates on our products.

The Northern Pacific.

The Northern Pacific Railway Company's line much of the way follows the route of the historic Lewis and Clark exploration party which was planned by President Thomas Jefferson to "trace the Missouri to its source; to cross the high lands (Rocky Mountains), and follow the best water communications to the Pacific Ocean." This party left St. Louis May 14, 1804, passed the "Gates of the Mountains" near Helena July 18, 1805, and reached what is now Three Forks, Montana, the head of the Missouri, on July 25. At the Salmon River divide they met the Shoshones and from them procured horses to go to Traveler's Rest in the Bitter Root Valley, near Missoula. After many weeks of hardship they paddled down the Columbia, passed the future site of Vancouver, Washington, and the mouth of the Willamette River, and arrived at the mouth of the Columbia, the present location of Astoria, Oregon, on December 8, where they remained for the winter. Homeward bound, the party left the seacoast March 23, 1806. At Traveler's Rest again they divided, Captain Clark with the main party returning by the outgoing route to the Three Forks of the Missouri and down the Yellowstone to its junction with the Missouri. Lewis, with a small party, went across the mountains to the Great Falls by way of Missoula and an Indian trail through a mountain pass to the northeast, reaching the Missouri. Lewis rejoined Clark near the mouth of the Yellowstone August 12, 1806. The explorers reached St. Louis September 23, 1806.

Forty years later, Asa Whitney, another explorer, initiated a railroad project to connect the Great Lakes and the Pacific Ocean. Within ten years I. I. Stevens began a survey which determined the Northern Pacific line. The story of Northern Pacific's construction, which began in 1870, is one of almost constant struggle through all forces of a gigantic wilderness and with the more suave but less tractable political and economic forces of the east. The last spike uniting the line from the west with that of the east was driven at Gold Creek, Montana, September 8, 1883, finishing 13 years of engineering accomplishment, ribbons of steel stretching across the trail of Lewis and Clark.

Since 1883, the increase in Northern Pacific mileage in the State of Montana has been approximately as follows:

1883	950 miles	1903	1775 miles
1893	1300 miles	1923	2235 miles
1928	2469 miles		

The figure of 2469 miles is the maintained mileage in Montana at the beginning of 1928. In the state on January 1, 1928, were 1689 miles of operated line.

The Northern Pacific Railway Company's tax bill in Montana in 1928 totals $1,931,623, of which state operating tax is $1,551,439 and land department, $380,184.

The investment in road and equipment in the year 1926 was $1,853,247.

The operating expenses for the year ended December 31, 1926, in Montana were $18,720,641.

Other statistics for the year ended December 31, 1927, are:

Revenue net ton miles	$2,111,574,175
Revenue net ton miles (trans-state)	1,564,208,120
Revenue passenger miles	112,823,999
Number of employees	4,940
Compensation	$8,617,000

The above labor statistics are based on relation of Montana to system in 1924, similar ratio being applied to 1927 system figures.

Number of freight and passenger locomotives assigned, 338

An average of $375,000 has been expended by the Northern Pacific Railway since 1922 in advertising Montana and the Northwest.

A list of Montana publications issued by the company is: "Montana, the Treasure State," "Montana Map Folder," "Flathead Valley Folder."

The Great Northern in Montana.

Following its traditional policy of providing convenient transportation to the country it serves, the Great Northern again in 1928 builds a new branch line in northern Montana, into one of the largest areas of good agricultural land in the state, a branch 78 miles long from Saco northwest to Hogeland, a new town in the northern part of Blaine county.

The new line opens a million and a half acres in which farm development is only begun. It represents a $2,000,000 investment by the Great Northern that will contribute to the welfare of hundreds of new farms and the annual production of wealth in the state.

The new line represents more than the mere building of new railroad mileage in Montana, for it is the signal of the birth of a new and permanent agriculture, the beginning of Montana's agriculture on a new and larger scale in which hard spring wheat, the world's best bread wheat, occupies the leading place. Improved methods of cultivation and new, large, labor-saving machinery have greatly reduced the cost of production and made it possible to grow profitable crops on a large part of Montana's 30,000,000 acres of agricultural land. Natural conditions also favor the raising of all kinds of livestock.

A Hundred People a Day Ask About Montana.

A hundred people a day ask about Montana's farm opportunities, another epoch in the development of Montana that has been signalized by the new line construction, the first since the World War interrupted the steady flow of settlers into the low priced lands of the Northwest. The surplus of farmers in the older states of the Mississippi Valley are looking toward Montana for farm homes.

America's last WEST is to be found along the Great Northern's 1888 miles (this includes the Saco-Turner line) of main and branch lines in Montana, a region larger than eastern states, 200 miles wide by 450 miles long, an empire of natural resources, millions of acres of fertile prairie and a half million acres of rich, irrigated land, bordered by one of America's grandest scenic regions, Glacier National Park and the Rocky Mountains, with two hundred miles more of forest and fertile protected valleys beyond the mountains.

Great Northern Hauls Half Montana's Grain.

The Great Northern annually transports almost one-half of Montana's grain crop, amounting for the 1927 season to over 40,000,000 bushels, grown along its own lines and 9,485 carloads of livestock, consisting of cattle, sheep, hogs and horses. Flour, sugar,

THRESHING CREW AT WORK IN EASTERN MONTANA

potatoes, dairy products, poultry and fruit are other important items in the agricultural products of the state.

Ten Great Northern Men Working for Montana.

The Great Northern publishes a general book about Montana's agricultural resources and opportunities, in addition to special books and folders on the irrigated sections and important districts. Thousands of copies are annually distributed to people who are interested and want to know about farm opportunities. In many different ways the attention of prospective settlers is directed toward Montana—by newspaper advertisements, exhibitions of agricultural products, lectures illustrated by stereopticon and motion pictures and by the personal work of ten traveling representatives. This work is carried on under the supervision of E. C. Leedy, General Agricultural Development Agent, at the general offices of the Company, St. Paul, Minnesota.

The total mileage of the Great Northern in Montana, December 31, 1927, was 2,569 miles including sidings, passing tracks and all others. Including the Saco-Turner line, it will be 2,647.

The Chicago, Milwaukee, St. Paul and Pacific Railroad.

The entrance of the Chicago, Milwaukee, St. Paul and Pacific Railway into the State of Montana dates from 1901—25 years ago—when the first reconnaissance work was begun.

In January, 1906, survey parties were organized and sent to Miles City and Harlowton, to locate a line from Montline to a point just of west of Harlowton, a distance of 357 miles, there connecting with the Montana Railroad, already constructed.

The line from the eastern boundary of the state to Harlowton was completed in 1908 and to St. Paul Pass Tunnel—the western boundary—in 1909.

When construction work was begun in 1906, the country between Montline and Terry was practically uninhabited, there being only one ranch house between Montline and Ismay and one cattle ranch between Ismay and Terry. At Ismay there was a ranch house and a small of amount of land under irrigation. The bench lands on either side of Corral, Sandstone and Fallon Creeks were unoccupied. The wide valley of the Yellowstone River between Bluff Point and Terry was devoted entirely to grazing, but it is now largely under cultivation. Through the Fort Keogh Military Reservation, west of Miles City, the land was not under cultivation, but at the present time is cultivated by non-irrigated methods. Between Antwerp, in the Big Porcupine Creek Valley, and the first crossing of the Musselshell River, a distance of 50 miles, only one ranch was in existence, while at the present time grain fields are scattered along the line between Vananda and Bascom and along the Musselshell River.

The Musselshell Valley was under irrigation from Harlowton east for a distance of about 100 miles. Large alfalfa fields covered the entire valley. Large flocks of sheep and herds of cattle were wintered here. Oats and some wheat were grown.

ON THE GALLATIN WAY TO YELLOWSTONE

From Melstone west to Harlowton the line follows the valley of the Musselshell River, crossing the river 12 times on steel bridges.

Many irrigation systems were encountered and had to be provided for.

Between Piedmont and Butte the railway crosses the Continental Divide in a very rough, mountainous country, requiring much heavy work.

At Haugan the ascent of the east slope of the Bitter Root Mountains begins, and the mountain grade with correspondingly heavy mountain work continues to St. Paul Pass Tunnel. Numerous high timber bridges were built during the original construction which were filled later, largely by sluicing. This country was virgin forest, with no trails.

When the Milwaukee Road's extension through Montana to the North Coast was decided, 25 years ago, trans-continental business had assumed important proportions and the then existing facilities were unable to move the tonnage promptly or satisfactorily.

Business men on the coast urged the speedy completion of the Milwaukee's line so that the congestion on other lines might be eliminated and the movement of traffic to and from the Sound expedited.

There was also a heavy and increasing trans-Pacific traffic to be considered, and, of course, the natural development of the fertile valleys and prairies was relied upon to furnish an important share of the railroad's tonnage.

That these calculations were sound is proved by the fact that for a number of years after the completion of the line through Montana and to the Coast a heavy and profitable business was enjoyed by this railroad.

Other conditions developed, however, that could not have been foreseen at that time. The Great War with its disturbance of the normal relationship between earnings and expenses, and the diversion of business to waterways completed years after the construction of the Milwaukee Railroad, both seriously affected the fortunes of this railroad.

In the face of these and other unsatisfactory developments the Chicago, Milwaukee, St. Paul and Pacific Railroad has established itself strongly in Montana and its neighboring states.

This is shown by the fact that there are in Montana 252 points at which the Milwaukee Road has facilities for handling business, and of these 191 are served solely by this road.

The fact that the Milwaukee Road is a most important carrier in Montana is also supported by freight traffic figures showing that close to 70% of the ton miles moved by this railroad in Montana and Washington originate at or are destined to points in those states not served by any other rail line.

It is interesting to consider the value of this railroad in other ways to the residents of Montana:

THRU THE MOUNTAINS WITH AN ELECTRIC LOCOMOTIVE

It has an important investment in right-of-way, station and service buildings, equipment, electrification, and in over 1,550 miles of tracks, much of it costly mountain railroad and all of it built without Government grants or aid.

It pays taxes amounting to over $1,000,000 annually, for the construction and maintenance of institutions and facilities for the benefit of the citizens of this state.

It employs some 3,400 persons in Montana, and their payrolls amount to $5,500,000 a year.

It purchases yearly about $1,500,000 worth of materials and supplies from producers and manufacturers of this state.

It is evident from the foregoing that in every way in which any industry can become closely and favorably identified with a community or a state, the Milwaukee Railroad is identified with Montana.

The most important and outstanding feature of the Milwaukee's construction activities in the state was the electrification of 415 miles of the line from Harlowton west to the state line.

This was begun in December, 1915, and completed in February, 1917.

The power is obtained from various streams in central and western Montana, mostly headwaters of the Missouri River. The current is transmitted to the substations, of which there are 13, at 100,000 volts, alternating, where it is transformed and converted to 3,000 volts direct current for train operation.

This electrification has made it possible to operate much more economically over the mountains than by steam power. Each of the mammoth motors can haul over the steep grades with apparent ease a train that it would take two or three steam locomotives to handle. By the electrification many steam engines were released for use on other parts of the railroad where water power for electrification is not readily available.

One interesting feature of electric operation is the fact that no fires are set by the motors. This is an important advantage in the heavily timbered regions where forest fires cause so much loss.

There are 26 tunnels on lines within the state—totaling 20,571 lineal feet. The St. Paul Pass Tunnel—length 8,771 feet—at the summit of the Bitter Root Mountains, lies partly in Montana and partly in Idaho.

The Milwaukee has three crossings of the Yellowstone River, twelve crossings of the Musselshell, eight crossings of the Hell Gate River, four crossings of the Missoula River, two crossings of the Missouri River, and two crossings of the Jefferson River.

The total weight of steel in these bridges amounts to 26,500,000 pounds. These bridges, and viaducts at other points, range from 330 feet to 2,000 feet in length, and from 75 to 200 feet in height.

In the last year a large number of culverts have been replaced with concrete, about 94 miles of track laid with 85-pound rail has been relaid with 100-pound rail, and other

STOCK RANCH IN SOUTHEASTERN MONTANA

important maintenance and replacement work has been carried out. Such activities will, of course, be continued in future to keep the property in first class condition and make improvements wherever possible.

In 1926 a 13-mile extension of the Big Blackfoot line was constructed to facilitate timber operations along the Big Blackfoot River in Missoula county.

The Chicago, Burlington and Quincy Railroad.

The Chicago, Burlington and Quincy Railroad, commonly called the Burlington, made its first start as the Aurora Branch railroad built in 1850 from Aurora, Illinois, to Turner Junction (West Chicago), a distance of 12 miles. It now owns over 9,000 miles of railroad in eleven states of the middle west and, with its control of the Colorado & Southern lines, makes up a system of some 11,475 miles, serving every important trade center in a vast tributary empire. In connection with the Northern Pacific and Great Northern, it serves the great markets in the north, east, south and west, as well as the Gulf and Orient.

The first construction in Montana consisted of 102 miles from the Wyoming state line northwesterly to Huntley, and was completed in 1894. The line from Fromberg south was built in 1911 and the Hardin beet spur in 1922. The company owns only 134.38 miles of main track in Montana, operating the 49.45 miles from Huntley to Fromberg via Billings under trackage rights from the Northern Pacific. The Burlington serves directly a very excellent agricultural area in southeastern Montana, better known as the Crow Country (the Crow Indians' favorite ground.) In the Chicago, Burlington and Quincy Railroad this Crow Country, as well as all of Montana, has a direct short line rail connection to the large consuming manufacturing centers in the thickly populated east, as well as connections with the central west and the southeast, thus enabling the produce of the farm, and the raw or manufactured products of the Montana mines and industries readily to reach the Gulf ports, as well as giving them easy access to other important markets that mean so much to the future and permanent development of Montana—as without these large markets made available to Montana, its development would of necessity lag.

Since "prosperous communities mean prosperous railroads," the Burlington is and always has been very vitally interested in the welfare and prosperity of the settlers, and in the success of industries along and tributary to its lines. Aid has been given through direction of settlement, and in building trackage to take proper care of the industries. Among other auxiliaries is the Hardin beet spur which is 12 miles long and was built to make possible the development of larger sugar beet area.

The Burlington has always been a well managed and operated railroad, giving efficient and adequate transportation both inbound and out. The company maintains a strong and efficient Agricultural Development Department, whose object is to help in directing settlement, as well as to assist farmers and business men, interested in the improvement of agriculture, by stimulating better and more economical production of agricultural products through special campaigns, lectures and meetings; to promote better systems of farming by diversification, crop rotation and methods of fertilizing; to improve the seeds, as well as treating to prevent plant diseases, so that increased yields may be had; to improve the quality of livestock by encouraging the use of pure bred livestock; to demonstrate better methods of grading and loading perishables to prevent loss in transit and discrimination against them on the markets; and to help develop better markets for farm products—in fact, anything that will make for better

CORN IN BIG HORN COUNTY

and more productive farms. The Burlington, Northern Pacific and Great Northern in their joint campaigns have spent large sums of money annually advertising Montana and the Pacific Northwest.

The Oregon Short Line.

Following are the statistics relating to the Oregon Short Line in Montana:

CLASS OF EMPLOYES	Number of Employes	Wages Paid	Expended for Improvement
Yardmen	3	$ 7,702.40	.....
Stationmen	40	75,526.04	.....
Trainmen	19	56,615.98	.....
Enginemen	27	71,165.09	.....
M. P. & M.	50	90,502.30	.....
Traffic Office	13	28,687.02	.....
Rental of Office	..	7,200.00	.....
M. of W. & S.	280	283,560.53	$135,169.24
Store Department	3	4,492.26	.....
Hospital Department	4	2,100.00	.....
D. C. & H. Department	74	81,207.38	.....
JOINT FACILITIES	Rent	Maintenance	Operation
Silver Bow Station	$ 339.84	$ 25.80	$ 7,451.83
Trackage Silver Bow-Butte	5,009.93	1,442.50	570.72
Butte Passenger Station	5,054.19	510.51	10,194.64
Butte Joint Yard	17,648.79	5,522.03	37,224.04
Engine House and Freight House	6,486.96	.....	.....

Railroad History.

The Utah & Northern was constructed from Eagle Rock, Idaho Territory, to Red Lake, Montana Territory, early in 1880, being a three-foot gauge line built of 35-pound rail. In 1881 this line was extended to Butte City. A branch was built from Silver Bow to Northern Pacific Junction in 1883, and in 1884 a branch was built to the Anaconda mines.

The gauge of the railroad was changed from three to standard gauge (4 feet 8½ inches) on the line from Pocatello, Idaho, to Silver Bow, Montana, in 1888, and on August 1, 1899, the Utah & Northern Railway was consolidated with the Oregon Short Line Railroad Company.

There has been relatively little increase in main line mileage constructed in Montana since 1899, the only new line built being the extension of the branch from St. Anthony, Idaho, to West Yellowstone, Montana, of which about four miles are in Montana.

AUTOMOBILE REGULATIONS

Montana's Motor Restrictions Are Only Common Sense Restrictions—Tourists Not Required to Have Licenses for Temporary Sojourn.

Restrictions in Montana's motor vehicle laws are not irksome to tourists. Non-resident owners of motor cars, temporarily sojourning in Montana, are not required to obtain licenses in this State, nor to register their cars.

Speed Regulations.

Under the State law there is no fixed speed rate per mile, the requirement being that chauffeurs drive in a careful and prudent manner, so as not to endanger the life, limb, property or other rights of any person. Cities and towns have the right to regulate speed and traffic upon the streets. In a majority of the cities the rate is not to exceed 12 miles an hour. Traffic must everywhere and at all times keep to the right. Moving in the same direction, the vehicle passing must turn to the left, and the one being passed to right. No motor vehicle is allowed to pass a street car which has stopped to receive or discharge passengers at a less distance than eight feet, nor at a speed greater than six miles an hour.

Accessories Required.

The State motor law requires that every motor vehicle operated on the public highways shall be provided with two sets of independently operated brakes in good working order, either one of which must be sufficient to stop the drive wheels of the car and prevent them from turning while the car is in motion. A horn or other device of signaling must also be a part of the equipment. Between one hour after sunset and one hour before sunrise every motor vehicle of the three or four wheeled type must display two lights in front, one on each side, and one light in the rear. Motor vehicles of the two wheeled type must display one white light in front and one light in the rear, the rear lights in both classes of vehicles must display red rays visible to the rear and throw white light upon the number plate carried on the rear, so that the number may be visible at a distance of 100 feet. The light of the front lamps shall be visible at least 200 feet in the direction in which the vehicle is proceeding.

The law states: "The front lights of all motor vehicles shall be equipped with some style of non-glare dimmers by which the intensity of such lights is diminished; and it shall be unlawful for the driver of any motor vehicle in the State of Montana to display on the front of such vehicle lights of such a degree of brightness as tend to confuse drivers of vehicles coming in contact with or moving in an opposite direction from such motor vehicle."

Violations are punishable by a fine not exceeding $100.00.

MONTANA ELK ON WINTER FEEDING GROUNDS

HIGHWAY DEVELOPMENT

Two Thousand Miles of Main Trunk Highways Completed by Close of 1928 Season—Program Calls for Connecting Every County Seat City.

Early in 1926 Montana began a road building program probably the most ambitious of any of the smaller populated western states.

This calls for total expenditures from all sources during a ten-year program of from one hundred to one hundred and twenty-five million dollars. At the end of the decade, the State will have at least six thousand miles of graveled highways. Every county seat will be connected with every other county seat.

About one-third of this program will be completed by the end of 1928 since Montana will have on that date about two thousand miles of graveled roads. Expenditures during 1928 in total will be about ten million dollars. This includes expenditures made by the federal government in forest reserves, in national parks and by cooperative agreement with the state highway commission. It also includes expenditures made by the state, counties and cities of Montana.

It must be remembered, in considering Montana roads, that Montana is a big state, thinly populated. There are 170 acres to each inhabitant. There are about 67,000 miles of roads of all sorts—and the population, January 1, 1928, was 546,000 so that we have only eight people, including women and children, to each mile of road. The expenditures now being made mean that each family in Montana is contributing approximately $100 per year to road work.

Until 1926 the state had been expanding so rapidly and the demand for new roads to permit farmers to haul their produce to market was so insistent, that most counties were compelled to devote their energies to increased mileage instead of improving their cross state highways. In 1925 a bill calling for a three-cent tax on gasoline used on the highways was initiated and passed by the heaviest majority ever received on an initiative measure.

Governor J. E. Erickson in commenting on the bill in the Good Roads Declara-

tion, June 21, 1927 said, "In no uncertain manner the voters of Montana have put the stamp of their approval upon the movement for better highways and they are keenly interested in the plans for bringing our citizens and communities closer together and making transportation of our products easier and less costly, through the medium of good roads. Obviously this transformation may not be wrought within a day, but an excellent beginning has been made and we look with confidence to the time when at least our main avenues of communication shall be a pleasure to the motorist and visiting tourist and a source of satisfaction and money-saving to those who seek a market for their farm products."

An outline of the results that will be accomplished by the Montana Highway Commission now cooperating with the Federal Department of Agriculture in building trunk lines through the state has been prepared for this volume by R. D. Rader, chief engineer, as follows:

Montana is the third largest State in the Union, and yet only nine States have a smaller population. A large percentage of the area of Montana is public land, from which the State receives no direct revenue, but through which highways must be constructed and maintained. These facts coupled with the great expense involved in building roads through the Rocky Mountains, make Montana's highway problem probably the most difficult of any State.

Montana, however, has at last taken her place with other States of the Northwest in a comprehensive and adequate highway program. In November of 1926, Initiative Measure No. 31 was passed by vote of the people of the State providing a three-cent gasoline tax for highway construction purposes. All the revenue from this gasoline tax, after deducting the refund for tax collected on gasoline used in machinery which is not operated on the highways, goes to the State Highway Commission, and is used to match Federal Aid in the construction of the State Highway System. The net revenue from the gasoline tax for the first twelve months it was in operation amounted to $1,383,604.65. About one-third of this was used in the maintenance of the already completed portions of Federal Aid Highways. The remainder was used to match Federal Aid on new construction.

Montana has been receiving approximately $1,550.000 of Federal money per year. This is used to cover 56.46 per cent of the cost of Federal Aid Highway projects. The State must furnish the remaining 43.54 per cent, and the three-cent gasoline tax makes it possible to match the amount of Federal Aid available each year. However, during the years 1925-1926 no State money was available for highway construction, so that the State fell behind during those years and

is still two years behind in matching Federal Aid. In addition to this, about one and one-half million dollars of Federal money was matched by project agreements which covered highway projects which have not yet been put under construction, and for which no State funds have yet been made available. The result is that about four and one-half million dollars of Federal money is now available to the State but cannot be used because State revenues, at present, do not provide sufficient funds to match it. Each Federal Aid appropriation is available for three years, and the gasoline tax each year provides sufficient funds to match one year's appropriation only.

The Federal Highway System was laid out in accordance with the Federal Highway Act which was passed by Congress in 1921. This Act provides that only 7% of the total public highway mileage of the State is eligible for Federal Aid. The total public highway mileage of Montana at that time was 67,100 miles, 7% of this being 4,697 miles, at which figure the total mileage of the 7% System was fixed. The most important highways, from the standpoint of the State and of the National system, were selected by the State Highway Commission and the Bureau of Public Roads, and the Federal Aid or 7% System thus laid out was approved by the Secretary of Agriculture in 1922.

Forest Highways.

There is a total of 512 miles of the 7% System which lies within the National Forests. This mileage is eligible for construction from Forest Highway funds, as well as Federal Aid funds. Forest Highway funds are administered by the Bureau of Public Roads and are not required to be matched by State money. Congress has been appropriating seven and one-half million dollars each year for several years for the construction of roads in the National Forests. A part of this money is used in what are called Forest Development Roads and Trails. These are built mainly for administrative purposes and for fire protection. The remainder of the Forest Highway money is used for the construction of public highways through the forests. These are fine modern roads and afford the transcontinental tourist an adequate highway through the Rocky Mountains, which have heretofore been a barrier to Coast to Coast traffic. They also make the wonderful scenery of the Rocky Mountains available to campers and pleasure seekers. These forest roads are of national value, and the appropriations should be largely increased so that they can be completed within the near future.

The Federal Government owns these forests, and the States and Counties receive no revenue from taxation within their limits. It is logical, therefore, that the Federal Government should bear the entire cost of these highways, and that their construction should be very much more rapid than is possible with the present appropriation.

Forest Highways are maintained by the Federal Government for two years after their construction is completed. They are then turned over to the State Highway Commission and thereafter maintained at State expense.

Work Accomplished.

On January 1, 1928, there had been completed 1,537 miles of highway on the 7% System. In addition to this, 182 miles of highway, which does not lie on the 7% System but which was completed with Federal Aid before the passage of the Federal Highway Act in 1921, was under maintenance, making a total of 1,719 miles which is being maintained at State expense. Approximately 300 miles of new highway will be completed in 1928.

It is the policy of the State Highway Commission to select the worst places on the highways for immediate construction, thus improving through traffic conditions at once. A great many of the sections, where gumbo soil in wet weather has made an impassable barrier to traffic, have already been turned into modern year-around roads, and it is possible even now for the autoist to set forth on a long trip through the State confident that he will be able to complete his trip even in wet weather. Under this policy, the whole system will improve very rapidly, and Montana can offer the transcontinental tourist adequate road service.

Maintenance of State Highways.

All maintenance of completed Federal Aid Highways is carried on by the State Highway Commission at State expense. There is no Federal Aid available for maintenance. The cost of maintenance is mounting rapidly with an ever increasing mileage of completed roads, and a rapidly increasing automobile traffic. Some maintenance by asphaltic oil surface treatments has been done, and it is expected to increase this as fast as funds are available. Adequate equipment for this work has been purchased by the State. Oiled roads are dustless and give the same service to traffic as paved roads. The asphaltic surface waterproofs the road, and at the same time prevents the loss of fine particles of gravel due to the action of balloon tires, wind, and rain. It is estimated that the loss of gravel due to these causes on a highway carrying an average of five hundred automobiles per day amounts to one inch per year.

Under the present laws, the State Highway Commission can maintain only completed sections of the Federal Aid System. The Counties of the State must maintain those stretches which have not been completed until funds are available for the State Highway Commission to construct and maintain them. County road funds are derived from a property tax levy for road purposes, and also from the automobile license tax which is refunded to the Counties in which it is collected. These County funds are available for the construction of State and County roads as well as the 7% or Federal Aid System.

Twelve Financial Districts.

Initiative Measure No. 31 divides the State into twelve districts. All State funds available for Federal Aid construction are allotted to these districts in the ratio which the mileage of all uncompleted highway on the 7% System in the district bears to the mileage of uncompleted Federal Aid Highway in the State. This insures that each district will receive its just share of highway construction each year, and provides that the whole System will be carried to completion with some degree of uniformity.

Ten-Year Program.

It is estimated that it will require ten years, beginning with the year 1927, to complete the Federal Aid or 7% System with well graded, drained and gravel surfaced highways. No pavement is contemplated until the entire System is completed in this way, except where the intensity of traffic requires a paved surface and where local funds are available to cover the increased cost of paving.

Snow Removal.

With the completion of well located and properly graded highways, the snow problem in Montana will very largely take care of itself. Adequate snow fences are much more satisfactory and economical than snow removal equipment. There are not sufficient State Highway funds at present to justify a program of snow removal, but there is no doubt that within a few years Montana will be able to join with neighboring States in keeping interstate highways clear of snow, and thus provide for winter tourist traffic.

Hog raising in Montana has been increasing faster than state consumption, and exports find a ready market in the North Pacific Coast cities.

HIGHWAYS

Many Side Trips to Little Known Beauty Spots—Eighteen Marked Trails Guide the Visitor in Montana.

Eighteen marked trails guide the tourist in Montana. A brief description is given below and by reference to the map in the back cover the visitor will be able readily to identify the highways.

Side Trips.

There are hundreds of good side trips, the attractions being fishing, boating, mountain climbing and viewing matchless mountain scenery. The tourist will be directed to these beauty spots by inquiring of commercial clubs or other public information places along the route.

THE YELLOWSTONE TRAIL: This is an old established route through seventeen fertile Montana counties and is known to tourists from the Atlantic to the Pacific. It enters the state at Baker and goes through Miles City, Forsyth, Billings, Livingston, Bozeman, Butte, Missoula to Wallace, Idaho, and Spokane.

TEDDY ROOSEVELT HIGHWAY: The northern route through Montana, from Mondak to Wolf Point, Glasgow, Malta, Havre, Shelby, Browning and into Glacier Park. Here automobiles are shipped to Belton and continue westward through Whitefish, leaving Montana at Troy and on to Spokane or the coast. To eliminate shipping, one can travel through Glacier Park on excellent roads to Canada and make the western connection to Spokane without delay or loss of time shipping.

NATIONAL PARKS HIGHWAY: From North Dakota this highway comes through Wibaux to Glendive, Miles City, and then follows along the Yellowstone Trail to Three Forks where it branches off to Helena and Missoula and then over the Flathead Reservation and around Flathead Lake to Kalispell and westward to Libby and Spokane. From Missoula there is an optional route via Thompson Falls and Sand Point, Idaho.

CUSTER BATTLEFIELD HIWAY: The best marked and a well advertised trail through the Bad Lands of South Dakota to Billings, Roundup and through Lewistown and the famous Judith Basin to Great Falls and on to Glacier Park via Choteau.

THE Y-G BEE LINE: This is the Montana Link of the National Park to Park Highway and an eighty per cent gravelled road between Yellowstone and Glacier National Parks. Part of the trip is through the National forests and very scenic.

BANFF-GRAND CANYON HIGHWAY: A well traveled road between Yellowstone Park and Lake Louise and Banff via Virginia City, Butte, Helena, Great Falls and through Glacier National Park into Canada and over the Banff-Windemere Highway.

GALLATIN WAY: The new entrance to Yellowstone Park, from Bozeman to the West Yellowstone entrance; a trip of less than a hundred miles, following the gorgeous Gallatin River amid beautiful Montana scenery.

GEYSERS TO GLACIER: A "two way" route from Yellowstone to Glacier National Parks; out at Gardiner to Livingston and Helena or the Gallatin Way to Bozeman, Helena and to Glacier Park via Augusta and Choteau.

THE BILLINGS-CODY WAY: To and from Billings this route is a popular and favorite one to Yellowstone Park and the scenery into the Park is awe inspiring.

THE SUNSHINE TRAIL—The business route from Butte, Helena, Great Falls through the famous Kevin-Sunburst oil fields to Lethbridge, Calgary and Edmonton. A direct north and south road connecting Montana with Alberta, Canada.

THE ELECTRIC HIGHWAY: A short cut through the Treasure State, branching off the main highways at Forsyth to Roundup, Harlowton, White Sulphur Springs and connecting at Helena.

THE SCENIC INTERNATIONAL HIGHWAY: From Canada through Gateway at the border to Whitefish and Kalispell; around Flathead Lake, one of the largest fresh water lakes in the United States, to Missoula through the famous orchards of the Bitter Root Valley and "over the mountains" to Wisdom and Dillon and on to Yellowstone Park.

THE VIGILANTE TRAIL: From Yellowstone Park to Butte by Virginia City and Twin Bridges through a country made famous by Montana's first gold rush and a visit to the romantic and quaint Virginia City, the headquarters of the Vigilantes who wreaked vengeance on the bandits in the early days.

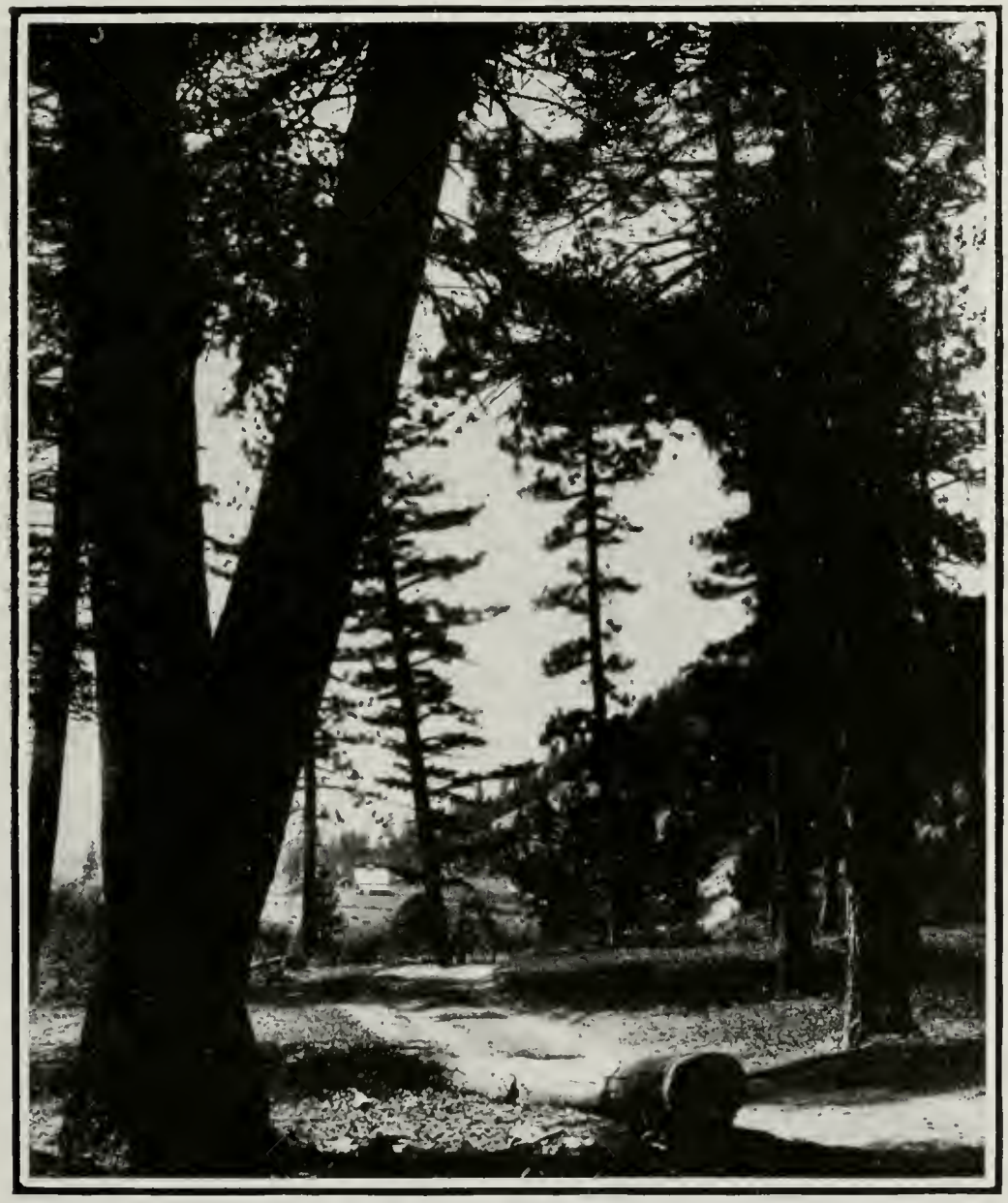
THE REGINA-YELLOWSTONE TRAIL: From Saskatchewan to Flaxville, Scobey and Wolf Point to Circle, Terry and Miles City and westward to Livingston and Gardiner.

THE DOMINION YELLOWSTONE TRAIL: From Canada to Malta, on to Lewistown and Harlowton and direct to Yellowstone Park.

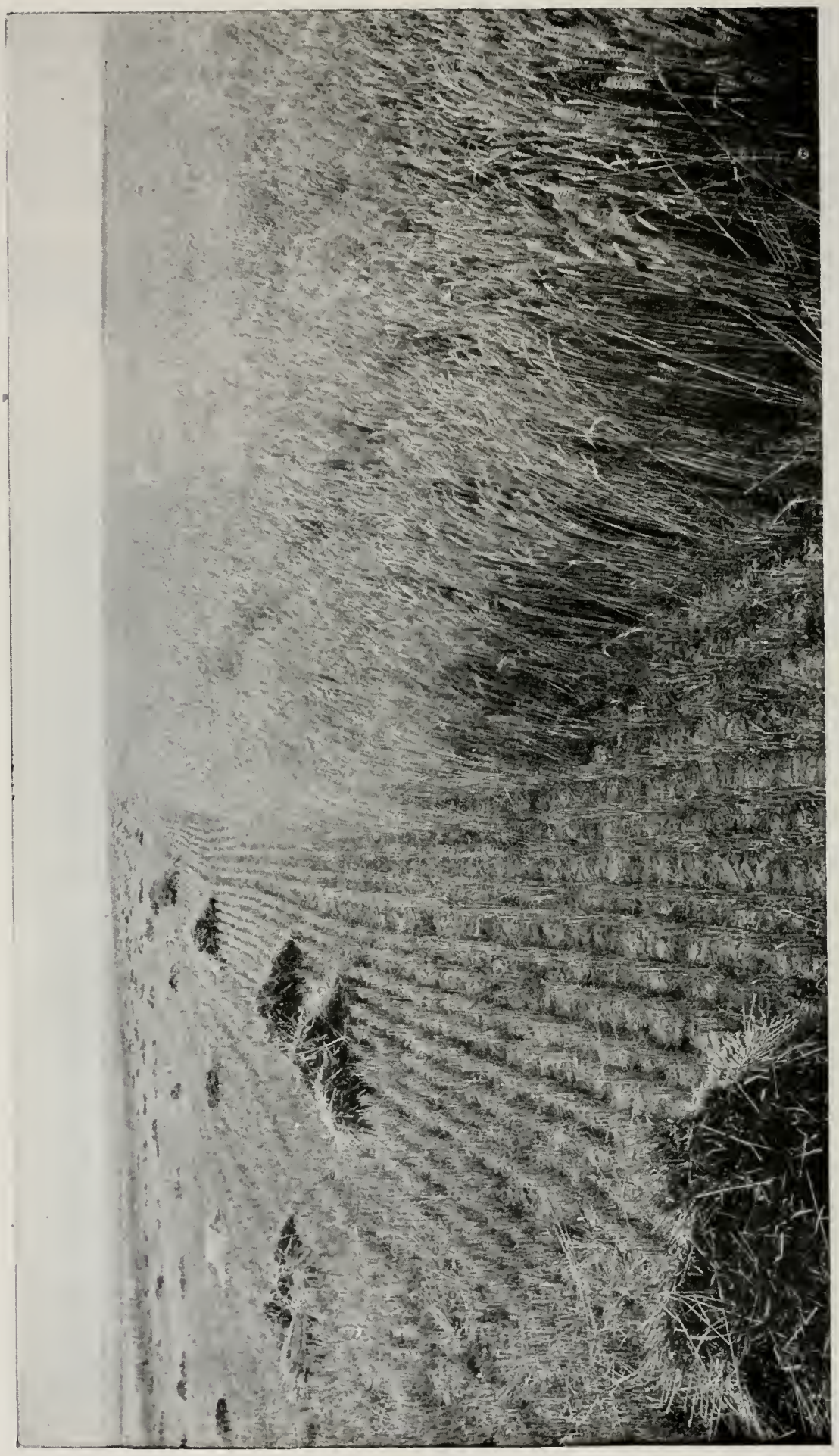
THE SKALKAHO HIGHWAY: Starting at Butte, the greatest mining camp on earth, to Anaconda with her huge copper and zinc smelters, around the beautiful Georgetown Lake to Philipsburg and Hamilton and through the Bitter Root Valley to Missoula.

THE CANADIAN-MEXICAN HIGHWAY: A new route from Canada through Plentywood, Culbertson, Sidney, Glendive, Wibaux, Baker, Ekalaka and to South Dakota and Southward.

GULF TO GLACIERS MOTORWAY: The Gulf to Glacier Motorway has its northern terminal at Calgary, which in addition to being an important distributing center of some 80,000 people, is also the gateway to the Banff National Park with its huge peaks and glistening glaciers. Its southern terminal is Tampico, Mexico, some 300 miles south of the American line on the best improved of all Mexican highways connecting with the United States, and which is to be extended to Mexico City and ultimately to the Pacific Coast.



PARK TO PARK HIGHWAY THROUGH THE TIMBER



Courtesy Gt. Northern Railway. WHEAT FARM NEAR TURNER, BLAINE COUNTY, ESTIMATED YIELD 35 BUSHELS PER ACRE

RECREATIONAL RESOURCES

In friendly rivalry with her sister commonwealths, Montana enters the lists and challenges comparison as the vacation land to be preferred for the summer's outing.

We call attention to the salubrity of the climate, the clearness of the water, the purity of the atmosphere and the grandeur of the scenery as reasons for our sincere belief that the State is destined in time to become the mecca of the summer tourists and travelers of America. The Treasure State, with her two great parks (Yellowstone and Glacier) and her beautiful lakes and valleys is a place where the tourist will love to linger, a fit place for rebuilding the body and renewing one's enthusiasm and love of life.

A huge recreation area, designed by nature as a place for pleasant pursuits, is Montana in vacation time. Governor Erickson writes:

"The visitor may pitch his tent where he pleases, in mountain canyon, or along trout streams; or take his choice of the hundreds of comfortable, though plain summer hostelries; draw up at night before a fireplace of blazing logs at scores of "dude ranches," or live at a great mountain chalet, costing more than a million dollars and built to accomodate half a thousand of his kind. He may spend the day fishing for trout or grayling, or enjoy a ride, with or without guide, on a trained saddle horse. He may gather a garland of the wild flowers that carpet the valleys and hillsides to the delight of the botanist. With rope and pick and companions he may scale the loftiest glaciers. If geology interests him, in Montana he will find spread before him a book, every page of absorbing detail. If fauna attracts, no finer field for study of wild animal life may be found than Montana. In Yellowstone, he may feed the lordly Silver-tip from his hand—if he be silly enough. At modest expense, if hurried for time, to the drone of an airplane motor he may sweep through the "Grand Canyon" or look down on Glacier's fields of ice."

Or, if a lover of beautiful things, he may "loaf" and enjoy himself, feasting eyes and building up muscle and nerve. When night falls he will early seek his couch, and if spread in the open, be lulled to sleep by the murmur of winds through the trees or the whisperings of mountain streams.

The following pages outline but a few of the places that the visitor will find well worth his time. He must remember always that Montana is a land of variety, that there are ten thousand camping grounds as yet unheralded, any one of which would be hailed with delight by those living in less fortunate communities.

And to all who would spend their summers with us, Montana offers not only the things that fire the imagination, but some things considered by the average man of more practical worth than mountain scenery—things that sustain the body and delight the appetite. The choicest products from orchard and dairy and garden and waving fields of golden grain—foods the finest and of every variety our hotels and lodges are able to provide for their guests at moderate prices.

OLD FAITHFUL GEYSER, YELLOWSTONE PARK

HISTORIC SCENES

Location of Scenes of Early Day Adventures Are of Interest and Many Are on or Adjacent to Tourist Highways.

Montana has an historic background that provides the tourist with an interest that never wanes; scenes of early day exploration, sanguinary Indian battles, military posts and fur trading centers; of Indian missions; of gold discoveries; places along the way made notable by stirring events in the emergence from an uncharted wilderness to a modern commonwealth.

In places throughout the state are scenes made memorable by men who "walked their hour upon the stage" in the early morning of Montana history; explorers, fur traders, military leaders, scientists, missionaries.

The names of the Verendrye brothers, Pierre and The Chevalier, are connected with the Big Horn and Powder River regions. The Great Falls of the Missouri, the upper reaches of the Marias, the Gate of the Mountains, and the Three Forks of the upper Missouri were given consideration in the journal of Lewis and Clark. Yellowstone Lake will recall the explorations of John Colter. The Bridger range that walls the garden valley of the Gallatin is a monument to the memory of Jim Bridger, the echoes of whose fame were awakened by the publication of Emerson Hough's "Covered Wagon." The names of Major Culbertson and Kenneth McKenzie are linked with the establishment of fur trading posts on the Marias, Teton and Missouri Rivers near Fort Benton, and it was the former who gave most encouragement to the scientific investigations of the famous naturalist, Audubon, when he visited the State. The Little Big Horn country is notable as the spot where the brave Custer and his faithful followers were slain by Sioux warriors, and in the Bearpaws, in northern Montana, was fought the last fight of Chief Joseph of the Nez Perces, who surrendered to General Nelson A. Miles.

There is no history quite so interesting as that of the early western settlers, Indians, Vigilantes and pioneers. The landmarks within the state made historic by these people are numerous and each has its individual background.

The tourist will probably find of interest a visit to one of Montana's many "Ghost Cities," or former mining camps. Many of these camps are located off the regular trails. Directions can be secured from information bureaus along the various routes.

Many of these scenes of outstanding early day adventures are on or adjacent to tourist highways. Reference is made to the chapter on the history of Montana for a list of historical points of interest.

SKALKAHO FALLS

Mount St. Charles College
LIBRARY
Helena, - Montana

MASONIC TEMPLE, NEAR EKALAKA, CARTER COUNTY

HUNTING AND FISHING

Thirty-Five Game and Bird Preserves Furnish a Retreat and Replenish Adjacent Hunting Grounds.

Montana is today the nation's greatest reservoir of wild life. Bear, elk and deer are found in the mountainous portions of the State and trout in the mountain streams. Sage hens and prairie chickens are plentiful in all parts of Montana. In almost every part of the state there are lakes where good wild fowl hunting is to be had in season. Thirty-five game and bird preserves have been established by the state fish and game commission which serve as inviolate retreat and as breeding grounds to replenish adjacent hunting and fishing areas. The commission also operates 14 separate fish hatcheries where millions of fingerlings are produced and planted in the thousands of lakes and streams of the state. Trained hunters and trappers are hired to keep down predatory animals.

A PACK TRAIN

Cost of License.

Montana has stringent game and fish laws. All persons desiring to hunt or fish must obtain licenses. A general license for residents costs $2.00. Non-residents license, general $30.00; limited license entitling holder to hunt and kill game birds and small game, and to fish with hook and line, $10.00. All citizens of the United States who have not lived in Montana six months must secure a non-resident license before hunting or fishing. Alien license, general, $50.00; fishing license, $10.00; non-resident fishing license (fishing only), $3.50. Children under the age of 15 years do not require a license, nor does any person hunting, killing or trapping predatory animals, prairie dogs, ground squirrels, skunks, weasels, jack rabbits, pocket gophers, hawks, crows or magpies. All licenses expire April 30, next succeeding their issuance.

It is illegal to hunt or kill any game animals or game birds from any automobile, nor shall game birds or game animals be killed or hunted from any aeroplane, power-boat, sail-boat or any floating device towed by a power-boat or sail-boat.

Forty fish with a net weight of 20 pounds and one extra fish is the limit for a day's fishing, and it is illegal to have more than 40 fish or more than 20 pounds net weight of fish in one's possession at one time. Game fish can be taken only by hook and line. Hunting and fishing licenses may be procured from dealers in most cities in the State.

Open Season on Game.

Open season for elk from October 15 to November 15. (Exceptions, see game laws.) Limit, one elk. Felony

IN GLACIER NATIONAL PARK

to remove the head or teeth of an elk and leave the edible portion in the field. Closed season on elk in 45 Counties of Montana and portions of Lewis and Clark, Powell, Missoula, and Gallatin Counties.

Open season for deer from October 15 to November 15. Limit, one male deer. Closed season on deer in Yellowstone, Rosebud, Custer, Powder River, Carter, Richland, Roosevelt, McCone, Dawson, Treasure, Prairie, Teton, Phillips, Garfield, Valley, Carbon, Musselshell, and certain portions of Fergus, Glacier, Pondera, and Gallatin Counties. (See game laws for particulars.)

Open season for grouse, prairie chicken, sage grouse, fool hen, pheasant, partridge, September 16 to September 25 both dates inclusive. Limit, five birds a day, or in one's possession at any one time.

Open season for geese, ducks, and brant, September 16 to January 1. Limit, 25 ducks a day, and eight geese or brant.

Open season for fur-bearing animals—muskrat, fox, mink and fisher—December 1 to April 15, following.

Permanent closed season on mountain sheep and mountain goats, buffalo, moose, caribou, antelope, quail, Chinese pheasant, Hungarian pheasant or partridge, wood duck, curlew, swan, loon and turtle-dove.

Penalties for Violation.

Violation of any term of the game law defined as a misdemeanor is punishable by a fine of $25 to $500, or imprisonment for not less than ten days nor more than 180 days, or both such fine and imprisonment.

For Hunter and Fisherman.

LAKE BOWDOIN: One of greatest natural wild duck preserves in United States. Thousands of mallards, blue wings and teal feed in season on wild rice and celery about lake. Near Bowdoin, Phillips County; on Northern Pacific and Theo. Roosevelt Highway.

WHITEFISH: Excellent deer hunting in forested foothills in vicinity of Whitefish, numerous mountain bears and lions in mountains farther away. On Great Northern, Theo. Roosevelt and Scenic International Highways. In Flathead County.

FORTINE: Unique commercial fish hatchery called "Echo Lake," specializing in eastern brook trout, located here. Fishing permitted at all times of year. On Great Northern and Theo. Roosevelt Highway. In Lincoln County.

EUREKA: Hunting unexcelled for sportsman willing to "rough it." Many deer in timbered regions around here. On Great Northern, Theo. Roosevelt and Scenic International Highways. In Lincoln County.

RAVALLI: Montana National Bison Park, located here, has large herd of buffalo, elk, deer and Rocky Mountain sheep. On Northern Pacific, National Parks and Scenic International Highways. In Lake county.

LIBBY: Heart of big game country of northwestern Montana. Mountain goats, black, brown, and giant silver tip grizzly bears, mountain lions, deer, and many virgin trout streams are some of the attractions offered to the huntsman and fisherman. On Great Northern, Theo. Roosevelt and National Park to Park Highways, in Lincoln County.

LIVINGSTON: Big trout hatchery located here. On Northern Pacific, Yellowstone Trail, National Park to Park Highway. In Park County.

BOZEMAN: U. S. Fish Hatchery here, big game country adjacent. On Northern Pacific and National Parks Highway. In Gallatin County.

DIXON: National Buffalo Range located here. On Northern Pacific. In Sanders County.

IN GLACIER PARK

Courtesy Northern Pacific

THE GRAND CANYON OF THE YELLOWSTONE

SCENIC FEATURES

Directory of a few Attractions Montana Presents to Tourists—Industrial Centers.

How many sportsmen can find contentment in an area containing 500 lakes and streams, peopled with the densest fish population found on the globe's water surface—one hundred billion trout? It matters not, but this is the estimate of the fish population of Glacier National Park made by J. R. Eakin, the genial superintendent and Glacier contains but one-tenth of Montana's recreational area. It is mentioned only to draw attention to the fact that no state offers more recreational variety for nature lovers than may be found in Montana. Two great National Parks, thousands of square miles of natural mountain camps—many never visited by the white man—the "dude" ranches, reminders of the old west; lakeside resorts which combine the beauties of lake and mountain scenery; and health-giving mineral springs with modern hotel accomodations, are among the best known of hundreds of vacation offerings.

To all classes of people the State presents a peculiar appeal at the time when the lengthening and drowsy days of summer send forth their irresistible call for outdoors.

To the world-weary her mountains beckon that they may come forth and renew life at Nature's own springs. To those who would get away from the worries and cares of routine existence and seek primitive comfort and health-giving relaxation amidst unusual scenes, Montana's deep forests and placid lakes offer inviting retreat. To the red-blooded who care to track big game, or battle with the fighting trout, Montana's best is America's best.

For the Summer Vacation.

Montana summer weather is almost perfect; no destructive tornadoes, few violent electrical storms, warm days tempered by mountain breezes, cool nights that bring refreshing rest. It is a pleasant change to leave the humid lower altitudes and find soothing ease among Montana's mountain resorts; every condition is here to satisfy the urge to get back for a time to elemental things and build up strength and refreshen the spirit to meet the world's tasks when vacation days come to an end.

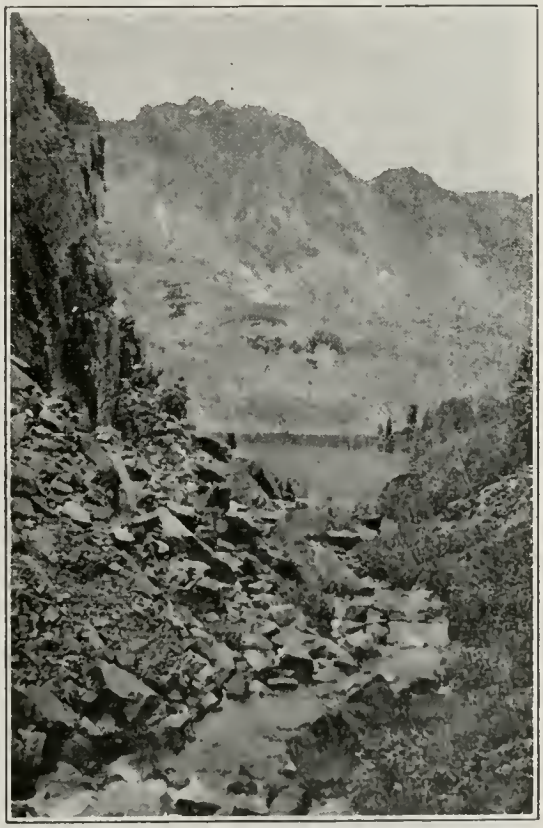
Following is a list of a few of the scenic features, industrial centers, Indian reservations and forests, that may be visited by the tourist:

Scenic Features and Attractions.

GLACIER NATIONAL PARK: See Page 97.

YELLOWSTONE NATIONAL PARK: See page 93.

FLATHEAD LAKE: Largest body of fresh water west of Great Lakes, total area of 360 square miles of exceptionally beautiful shore line; the lower slopes clothed in heavy timber, guarded by protecting mountain ranges that reflect majestic, white mantled peaks in the



IN THE SPANISH PEAKS COUNTRY

NATURAL BRIDGE IN BLAINE COUNTY

lake's clear waters. On the Northern Pacific, National Parks and Scenic International Highways. In Lake and Flathead County.

KOOTENAI CANYON AND FALLS: One of most beautiful canyons in northwest, extending from Rexford, in northern part of Lincoln county, south to Jennings then in a northwesterly direction through Troy and Yakt, on the boundary line of Montana, a distance of about 100 miles. The winding Kootenai river with its milky green waters brawls along between rocky, steeply forested slopes of the canyon and but for the Kootenai Falls, a mountain cataract of exceeding beauty, located about 10 miles northwest of Libby, would be navigable for several hundred miles. The combination of rock coloring, bright and deep greens of grasses and timber, vivid tints of sky and river form a picture of a rainbowlike, not easily forgotten beauty.

LEWIS AND CLARK CAVERN: A wonderful cave in the mountains, about half way between Whitehall and Three Forks, set aside as national monument by President Roosevelt in 1908. On the Northern Pacific and Yellowstone Trail, in Jefferson county.

CABINET GORGE: Remarkable gorge through which the, at this point sharply narrowed, Columbia River flows. About 60 miles northwest of Thompson Falls. On Northern Pacific. In Sanders county.

GIANT SPRINGS: Third largest fresh water spring known, flowing 36,300 cubic feet per minute, or 391,960,000 gallons every 24 hours. Also Great Falls of Missouri, the "Niagara of the West", both located in city of Great Falls. On Great Northern, National Park to Park Highway, Yellowstone Glacier Bee Line and others. In Cascade county.

DUPUYER: Highest rock filled dam in United States on Birch creek, 18 miles distant. Dupuyer is in Pondera county on the Yellowstone Glacier Bee Line and Geysers to Glacier Road.

BEARTOOTH PLATEAU AND GRASSHOPPER GLACIER: In Beartooth National Forest, reached by pack horses procured at Red Lodge, Carbon county. A waste of granite, lakes and small glaciers; one mammoth glacier named Grasshopper Glacier because of the millions of grasshoppers embedded in the ice. Red Lodge is on the Northern Pacific.

BLACKFOOT VALLEY: Follows beautiful canyon of Big Blackfoot river, in Missoula county, between towering, heavily timbered mountains.

BITTER ROOT VALLEY: Extending from Missoula south for nearly 100 miles, this is one of the most beautiful, as well as highly developed agriculturally and horticulturally, valleys in the state. In Missoula and Ravalli counties. The Northern Pacific and Scenic International Highway run through this valley.

GALLATIN GATEWAY: New entrance to Yellowstone Park, opened up in 1927 and extending from Bozeman south to the Park, a distance of about 90 miles. Very beautiful approach to Yellowstone, offering many lovely vistas of sheer rock walls, turbulent waters, thick forests, deep blue lakes and open valley lands for the traveler. In Gallatin county.

GATES OF THE MOUNTAINS: Missouri River Canyon named by Lewis and Clark expedition. Motor boating through canyon where massive, rocky walls rise sheer for hundreds of feet. About 18 miles north of Helena. In Lewis and Clark county.

BALANCED ROCK: Estimated to weigh 50 tons and perfectly balanced on a base less than two feet square. Near Red Lodge, Carbon county.

Industrial Centers of Montana.

SHELBY: Headquarters of Kevin-Sunburst oil development, these proven oil fields lie about 20 miles north of Shelby, in Toole county. Producing wells are scattered over an area of 15 miles. In 1927 this field led the state in oil production, producing over 4,000,000 barrels of oil, at a value of about $5,500,000. On Great Northern and on Theo. Roosevelt Highway.

KALISPELL: Chief market place for both the Flathead Valley and Northwestern Montana; flour mills, saw mills and active jobbing houses among its industries. Center of Flathead Valley, largest and best developed agricultural region between Glacier Park and Spokane. Many kinds fruit grown successfully. Good livestock and dairying region. Numerous logging camps. On Great Northern, National Park to Park Highway and Theo. Roosevelt Highway. In Flathead county.

EUREKA: Headquarters and rapidly growing marketing center for Tobacco Plains country. About 40,000 acres of prosperous agricultural land included in this valley. Plant here where stumps and waste logs are transformed into mucic acid, used in cream of milk sugar and in the manufacture of baking powder. Stock raising and lumbering operations carried on. On Great Northern, Theo. Roosevelt and Scenic International Highways. In Lincoln county.

LIBBY: Market center for Kootenai Valley, good agricultural section, soil exceptionally rich. Center also of growing lumbering and retail business. On Great Northern, National Park to Park and Theo. Roosevelt Highways. In Lincoln county.

COLSTRIP: Coal mine, opened up by Northern Pacific, about 34 miles south of Forsyth in Rosebud county, third among counties of the state with a production of over 700,000 tons in 1927. On Northern Pacific.

CATTLE GRAZING IN THE FOOTHILLS

HUNTLEY: Center of government reclamation projects; wonderful irrigated farms. On Northern Pacific, Yellowstone Trail and National Parks Highway. In Yellowstone county.

BILLINGS: Center of thriving agricultural region. Location of first and largest sugar beet factory in the state. Center of irrigated area of about 500,000 acres; crop averages uniformly high. On Northern Pacific, Yellowstone Trail, Custer Battlefield and National Parks Highways. In Yellowstone county.

BUTTE: Founded during gold rush of 1864, named after isolated butte, "Butte Hill," reputed to be "richest hill on earth." Greatest mining camp in the world; produces over 300,000,000 pounds of copper annually. A city of two levels, one above and one below ground; Butte district copper mine workings aggregate 900 miles and produce 30 per cent of copper mined in United States, 18 per cent of that mined in the world. The "metropolis" of Montana and wholesale distributing point for entire state, five transcontinental systems entering the city. On Yellowstone and Vigilante Trails. In Silver Bow county.

ANACONDA: Largest smelter and smoke stack in the world located here. Copper ores of Butte treated and sulphuric acid, arsenic and phosphate fertilizer manufactured by thousands of tons yearly. Giant stack is 585½ feet high with walls 5½ feet thick and diameter at base of 86 feet, at top, of 60 feet. On Southern Montana Railway and the Skalkaho Highway. In Deer Lodge county.

ROUNDUP: Devil's Basin and other oil domes. In Musselshell county. Largest shaft coal mine west of Mississippi, 3,200 tons daily production. Musselshell county led all counties of the state in total production of coal in 1927, producing approximately 1,119,000 tons. On Chicago, Milwaukee Railway, Custer Battlefield and Electric Highways.

LEWISTOWN: Headquarters for many oil concerns operating in Cat Creek field. In Fergus county. Distributing and supply point for Judith Basin, best developed, non-irrigated farming district in state. On Chicago, Milwaukee, Custer Battlefield Highway and Dominion-Yellowstone Trail.

MISSOULA: Named from Selish Indian word meaning "At the stream of surprise or ambush," applied by these Indians to the Hell Gate region because Crows and Blackfeet Indians were wont to lay in wait for them here. Center of agricultural and horticultural district, located at foot of Bitter Root Valley, one of most prosperous and beautiful valleys in the state. Th "Garden City" of Montana. First locality west of Mississippi where fruit is raised in large commercial quantities. Center also of lumbering operations. On Northern Pacific, Yellowstone Trail, National Parks and Scenic International Highways. In Missoula county.

GREAT FALLS: Chief distributing and marketing point for northern and central Montana. Located on south side of Missouri River, here over one thousand feet in width, with five great cataracts near by thundering down the river. Power plants develop 164,000 horsepower; electric power available from the Great Falls estimated to be about 850,000 horsepower. Copper refinery, copper rod and wire mill, electrolytic zinc plant, ferro-manganese plant containing largest electric furnaces in world; large and growing flour mills, largest meat packing plant in state located in the "Electic City," so christened because of its vast source of power. On Great Northern, Yellowstone-Glacier Bee Line, National Park to Park Highway and Banff-Grand Canyon Road. In Cascade county.

HAVRE: Distributing and marketing point for wide territory. In Hill county. Head of irrigated section of Milk River Valley. Center of big wheat raising district. On Great Northern and Theo. Roosevelt Highway.

GLENDIVE: Center of agricultural district, mainly dry farming, also of stock raising region; railway division point. On Northern Pacific, National Parks and Canadian Mexico Highways. In Dawson county.

WHITEFISH: Lumbering market, located at foot of Whitefish Lake and head of Flathead Valley. In Flathead county. On Great Northern, Theo. Roosevelt and Scenic International Highways.

BIG SANDY: Marketing center of rolling stock raising and grain growing country. Considerable coal mined here. On Great Northern. In Chouteau county.

BELT: Center of coal mining district in Cascade county, produced about 200,000 tons in 1927. Marketing point for important stock-raising district, mainly cattle. On Great Northern and Yellowstone-Glacier Bee Line.

RED LODGE: Center of important coal mining district in Carbon county. Washoe and Bear Creek also important coal mining towns in this county. Production in 1927 exceeded 800,000 tons. Center also of stock-raising and agricultural region. On Northern Pacific.

NEIHART: Location of important silver mining interests. On Great Northern, Yellowstone-Glacier Bee Line and National Park to Park Highway. In Cascade county.

YOGO SAPPHIRE MINES: These mines are located in Judith Basin county about 27 miles from Hobson, Montana, extend from canyon of Yogo creek to Judith River, distance of about five miles. Sapphires mined here for past 30 years with an estimated value of over $10,000,000. One of largest gem bearing ore deposits in world and because of their perfect coloring and exceptional quality, Montana sapphires hold a leading place in the world demand for this stone. Hobson is on the Great Northern Railway.

A TROUT STREAM IN THE LACE LAKE REGION

POLSON: On southern Flathead Lake. Boats operate between Polson and Somers. One of largest undeveloped hydro-electric power sites in Montana located here. Important shipping point on Flathead Lake. On Northern Pacific and National Parks Highway. In Lake county.

State Institutions.

MISSOULA: State University. In Missoula county, on the N. P. Ry., the Yellowstone Trail, National Parks and Scenic International Highways.

BOZEMAN: State Agricultural College. In Gallatin county, on the N. P. Ry., the National Parks Highway, Geysers to Glacier Road and Gallatin Way.

BUTTE: State School of Mines. In Silver Bow county, on the G. N., the B. A. &. P., the C., M. St. Paul and P. Railways, the Oregon Short Line and on the Yellowstone and Vigilante Trails.

DILLON: State Normal School. In Beaverhead county, on the Oregon Short Line, the Scenic International Highway and Banff-Grand Canyon Road.

BILLINGS: Eastern Montana State Normal School. In Yellowstone county, on the N. P. Ry., the Yellowstone Trail, National Parks and Custer Battlefield Highways.

HAVRE: Northern Montana Agricultural and Normal Training School. In Hill county, on the G. N. Ry., the Theodore Roosevelt Highway.

HELENA: State capitol. State Vocational School for Girls. In Lewis and Clark county, on the N. P. and the G. N. Railways, the Electric Highway, Geysers to Glacier Road and Banff-Grand Canyon Road

TWIN BRIDGES: State Orphans' Home. In Madison county, on the N. P. Ry., the Vigilante Trail and Banff-Grand Canyon Road.

BOULDER: State School for Deaf and Blind. In Jefferson county, on the G. N. Ry., the Banff-Grand Canyon Road.

WARM SPRINGS: State Hospital for Insane. In Deer Lodge county, on the N. P. Ry.

DEER LODGE: State Penitentiary. In Powell county, on the N. P. and the C. M. & St. P. Railways, the Yellowstone Trail.

MILES CITY: State Industrial School for Boys. In Custer county, on the N. P. and the C. M. St. P. & P. Railways, the Yellowstone Trail, National Parks and Regina-Yellowstone Highways.

COLUMBIA FALLS: State Soldier's Home. In Flathead county, on the G. N. Ry., the Theodore Roosevelt and Scenic International Highways.

GALEN: State Tuberculosis Sanitarium. In Deer Lodge county, on the G. N. Ry., and the Yellowstone Trail.

YELLOW BAY: State University Biological Station. Located on east side of Flathead Lake in northwestern corner of the state.

Indian Reservations.

BLACKFEET INDIAN RESERVATION: This is the largest, in regard to population, of the reservations. Located in extreme northern Montana, mainly in Glacier, small portion in Pondera county. Browning is headquarters town for the reservation. Most progressive of Indian tribes, now practically self-supporting.

CROW INDIAN RESERVATION: In extreme south central Montana, in Big Horn county mainly, small part in southern Yellowstone county, largest of the reservations in the matter of territory included within boundaries. Crow Agency is the headquarters; Custer Battlefield is within reservation.

FT. BELKNAP RESERVATION: In north central Montana, greater part of reservation in Blaine county, small part in Phillips county. Harlem is the headquarters.

TONGUE RIVER, NORTHERN CHEYENNE RESERVATION: In southern Montana, east of Crow Reservation, in Big Horn and Rosebud counties. Lame Deer is the headquarters.

FORMER FT. PECK RESERVATION: The reservation was formerly located in northeastern Montana and included a large portion of Valley and Roosevelt counties, the southern part of Daniels and Sheridan counties. This reservation was opened to settlement in 1913.

ROCKY BOY RESERVATION: Small reservation in extreme southeast corner of Hill county.

CARL BUTTOLF FARM NEAR TURNER, "ON THE BIG FLAT" ABOUT 200,000 ACRES IN NORTHERN BLAINE COUNTY.
A new line of the Great Northern crosses the Big Flat from east to west, and brings convenient transportation to this excellent farming region.

National Forests.

(See Chapter on Forest Resources.)

KOOTENAI NATIONAL FOREST: In extreme northwestern Montana, mainly in Lincoln county, headquarters at Libby, Montana.

BLACKFEET NATIONAL FOREST: In northern Montana, just east of Kootenai Forest, mainly in Flathead county. Headquarters at Kalispell, Montana.

CABINET NATIONAL FOREST: In western Montana, south of Kootenai Forest, in Sanders county. Headquarters at Thompson Falls, Montana.

LOLO NATIONAL FOREST: In west central Montana, in Mineral and part of Missoula counties. Headquarters at Missoula, Montana.

MISSOULA NATIONAL FOREST: In west central Montana, east of Lolo Forest, largely in Missoula and Granite counties but extending also into Powell, and Lewis and Clark counties. Headquarters at Missoula, Montana.

FLATHEAD NATIONAL FOREST: In northwestern Montana, mostly in Flathead county, some part in Lake county. Headquarters at Kalispell, Montana.

BITTER ROOT NATIONAL FOREST: In southwestern Montana, mainly in Ravalli county but extending into Granite also. Headquarters at Hamilton, Montana.

BEAVERHEAD NATIONAL FOREST: In extreme southwestern Montana, almost entirely in Beaverhead county, small portion in Silver Bow. Headquarters at Dillon, Montana.

LEWIS AND CLARK NATIONAL FOREST: In west central Montana, east of the Flathead and Missoula Forests, mainly in Lewis and Clark county, part in western Teton county. Headquarters at Choteau, Montana.

HELENA NATIONAL FOREST: In west central Montana, south of Lewis and Clark Forest, extends partly into Lewis and Clark, Powell, Jefferson and Broadwater counties. Headquarters at Helena, Montana.

DEER LODGE NATIONAL FOREST: In southern Montana, in Deer Lodge, Granite and Jefferson counties. Headquarters at Butte, Montana.

MADISON NATIONAL FOREST: In southwestern Montana, south of Deer Lodge Forest, almost entirely in Madison county, small part in eastern Beaverhead county. Headquarters at Sheridan, Montana.

GALLATIN NATIONAL FOREST: In south central Montana, in Gallatin, Madison and Park counties. Headquarters at Bozeman, Montana.

ABSAROKA NATIONAL FOREST: In southern Montana, east of Gallatin Forest, mainly in Park county, partly in Sweet Grass and Meagher counties. Headquarters at Livingston, Montana.

BEARTOOTH NATIONAL FOREST: In southern Montana, east of Absaroka Forest, in Stillwater, Park and Carbon counties. Headquarters at Billings, Montana.

JEFFERSON NATIONAL FOREST: In central Montana, mainly in Cascade and Judith Basin counties, also in Golden Valley county. Small, separate division of this forest in Phillips county. Headquarters at Great Falls, Montana.

CUSTER NATIONAL FOREST: In southeastern Montana, in Powder River and Rosebud counties. Headquarters at Miles City, Montana.

SIOUX NATIONAL FOREST: In extreme south eastern boundary of Montana, in Carter county.

LIBRARY
Montana

IN THE "DUDE RANCH" REGION, NEAR RED LODGE, CARBON COUNTY

HOT SPRINGS AND RESORTS

Twenty-Four Listed Thermal Springs—Have Hotel Accommodations for Tourists.

Montana has many thermal or mineral springs. They constitute a valuable natural resource. The flow of water is copious at some places, both hot and cold water, bubbling cheerily out of Nature's laboratory, side by side. Analysis of their waters and medical counsel as to their efficiency may be obtained by writing to the State Board of Health or to the proprietors of the resorts.

The Indians bathed in these bubbling pools and went away refreshed and rejuvenated. No wonder they used to say, "This is the dwelling place of the Great Spirit."

Later gold seekers and settlers camped at the springs and made use of the medicinal waters. Today accommodations of every variety may be found by the tourist; huge hotels costing half a million dollars or more, or simple little log cabins. At other places, far from railroad lines, the visitor must pitch his tent. Following is a directory giving the principal resorts:

Hot Springs and Resorts Located in Sanders County.

CAMAS HOT SPRINGS: On the old Flathead Indian Reservation, twenty miles north of Plains, which is on the Yellowstone Highway and Northern Pacific Railway. Hotels, cabins, bungalows, camping grounds. Fishing, mountain scenery.

QUINN'S HOT SPRINGS: On Missoula River about five miles from Paradise, Montana. Modern hotel and one log cabin (American plan). Boating, fishing, hiking, hunting in season. Paradise is on Northern Pacific Railway.

Hot Springs and Resorts in Deer Lodge, Missoula and Ravalli Counties.

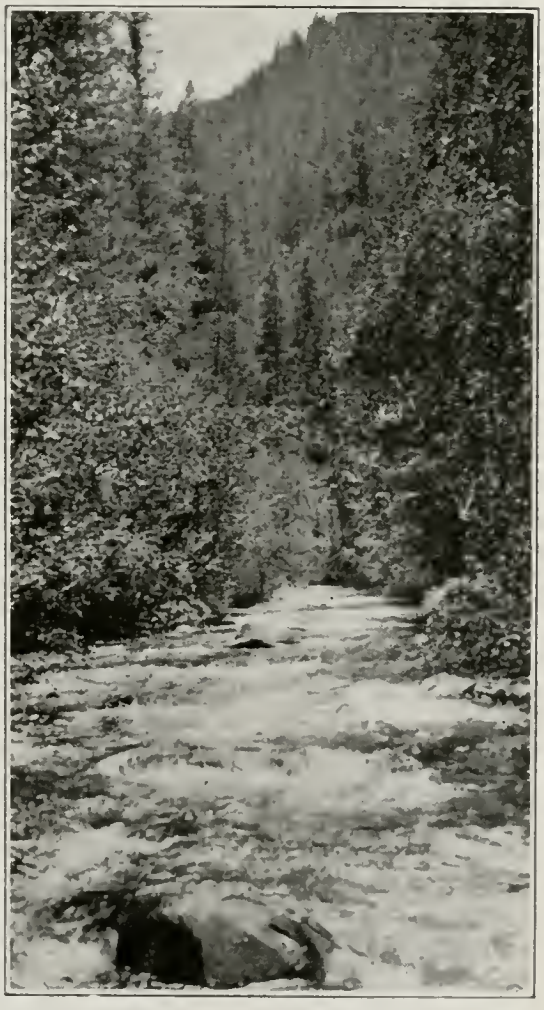
GREGSON HOT SPRINGS: Seventeen miles from Butte and eleven miles from Anaconda, on good road from Butte to Deer Lodge via Anaconda. Also on Northern Pacific and Chicago, Milwaukee and St. Paul railways. Plunge-vapor baths. Seventy-five room hotel. Free camping grounds equipped with water, stoves, etc.

LO LO HOT SPRINGS: Reached by stage from Lo Lo, Ravalli county, a small town on the western Park to Park road, eleven miles south to Missoula. Plunge 40 by 60 feet. Hotel and dining room. Cabins and tents. Fishing. Lo Lo peak, elevation 11,000 feet, a landmark of the region.

MEDICINE HOT SPRINGS: Short distance from Sula P. O. on western Park to Park route, eighteen miles south of Darby. Hotel, plunge, bathhouses, cabins. Good fishing.

SLEEPING CHILD HOT SPRINGS: Situated on Sleeping Child Creek, nineteen miles southeast of Hamilton on the western Park to Park route. Hotel, plunge, bath houses, cabins, fishing.

Hot Springs and Resorts in Jefferson, Lewis and Clark, and Meagher Counties.



WEST FORK OF THE BITTER ROOT

BOULDER HOT SPRINGS: Thirty-five miles

A WHEAT FARM IN BLAINE COUNTY, NORTHEASTERN MONTANA, ON THE NEW GREAT NORTHERN EXTENSION

from Helena, thirty-seven miles from Butte on Great Northern Railway and middle Park to Park Highway. Mission type hotel with 125 guest rooms. European plan. Plunge; vapor baths.

BROADWATER HOT SPRINGS: Two miles from Helena on middle Park to Park highway and on Northern Pacific and Great Northern Railways. Tent city accommodates 100 guests, electric lights and hot water; tourist camps. Plunge, one of largest enclosed pools in the world; dancing. One mile from U. S. Veterans Hospital, electric cars to city every half-hour.

ALHAMBRA HOT SPRINGS: Seventeen miles south of Helena and fifty miles north of Butte on middle Park to Park road and on Butte branch of Great Northern Railway. Modern hotel, American plan. Plunge, Baths, Dance Hall, Saddle horses. On Banff-Grand Canyon Road.

PIPESTONE HOT SPRINGS: Seven miles west of Whitehall and twenty-five miles from Butte. Four miles north of Yellowstone Park Highway. Also on Northern Pacific and C. M. St. P. & P. railways. Clean, modern hotel, a big plunge, vapor baths, individual cabins, free camp sites. Saddle horses and pack outfits available for excursions into the mountains.

SUN RIVER MEDICINE SPRINGS: About 20 miles west of Gilman, Montana. Several log houses. Covered plunge 8 by 20 feet. Saddle horses for rent. Fishing in nearby streams, and in Salmon Lake, a distance of about 35 miles. Hiking, hunting in season.

WHITE SULPHUR SPRINGS: At White Sulphur Springs, Meagher county, on Park to Park Highway, on branch line from Ringling. Wonderful sulphur springs located in town. Accomodations at hotels or private hospitals.

Hot Springs and Resorts in Beaverhead, Silver Bow and Madison Counties.

BARKELL HOT SPRINGS: South of Butte on the Twin Bridges branch of the Northern Pacific Railway and on a main highway from Butte to the western entrance of the Yellowstone National Park. New plunge being built. Camping grounds.

BIG HOLE HOT SPRINGS: At Jackson, Beaverhead county, on western Park to Park road. Small enclosed pool. Hotel accomodations in the town. On Scenic International Highway.

ELKHORN HOT SPRINGS: In Beaverhead National Forest, forty-two miles northwest of Dillon; reached from western Park to Park Highway. Open plunge. Camping grounds set aside for tourists by Forest Service. Small supply store. Good fishing.

JARDINE HOT SPRINGS: At Jackson, Montana about 40 miles west of Dillon on the Oregon Short Line. Comfortable, frame hotel. Plunge 40 by 60 feet. Good fishing, saddle horses for rent, hunting in season. Wild West show at Wisdom about 15 miles north. Camping trips into mountains if desired. (American plan.) On Scenic International Highway.

POTOSI HOT SPRINGS: About 15 miles southwest of Harrison, Madison county, on Yellowstone Trail and National Park Highway. Eight miles of drive is through Potosi canyon, flanked by numerous majestic snow-capped peaks. The hot springs lie in natural park at foot of these peaks. Trout stream runs through park. Camp grounds, both grounds and hot springs free to public.

Hot Springs and Resorts in Gallatin, Park and Sweet Grass Counties.

ANDERSON SPRINGS: Ten miles above McLeod, Montana, 26 miles south of Big Timber on Northern Pacific Railway. Large stone hotel, cabins and tents, plunge 20 by 30 feet. Saddle horses for rent. Fishing, hunting in season.

BOZEMAN HOT SPRINGS: Seven and one-half miles from Bozeman on Gallatin Highway to Yellowstone National Park. Natural mineral springs. Large plunge; a tent city; dining room and dancing pavilion.

CHICO HOT SPRINGS: Three miles from Emigrant on Yellowstone and National Park Highways, and on Park branch of Northern Pacific railway. Accommodations for 150 guests. Plunge and private baths. Hospital in connection. Dance hall; garage.

HUNTER'S HOT SPRINGS: Twenty miles east of Livingston on Yellowstone and National Park Highways and eastern Park to Park highway and Northern Pacific railway. Plunge, vapor baths, new hotel accommodating 300 guests. American and European plans. Cottages, tennis, golf, hunting and fishing. Free camp site electric lighted, other out-door conveniences. Garage, repair work, accessories.

MONTANAPOLIS SPRINGS: Thirty-three miles from Livingston. Neat, rustic cabins. Large lobby in main building, good dance floor. Saddle horses and guides. Trout fishing. Relief from hay fever.

McLEOD HOT SPRINGS: Hotel faces Boulder River, about 18 miles from Big Timber, Montana. Large frame building with porch on two sides, also tents and tent houses. Separate dining room, dance hall, natural hot water plunge 30 by 50 feet. Horses for rent. Good fishing, hiking, hunting in season.

TOM RICE: Plunge, Three Forks, Montana.

DUDE RANCHES

Tourist Offered Chance to "Rough it" in Secluded Foothills—State now Has More Than 100 Ranch Resorts.

A popular vacation offering which Montana presents to inhabitants of the more crowded districts of the world is the dude ranch where a chance to "rough it" for a few weeks and secure a glimpse of the old west are the feature attractions. Visitors come both by rail and by motor to these resorts which are usually situated many miles from the ordinary channels of motor travel.

Probably no state in the Union affords greater opportunities for the development of the dude ranch business than does Montana, with its many ranges of mountains, its thousands of trout streams, its myriads of lakes and its innumerable places of scenic beauty.

The typical dude ranch is located in a mountain valley or in the foothills. The air of seclusion from the modern world is complete; and yet telegraph and telephone lines give instant access to the most remote market places and business centers and a few hours drive connects with transcontinental rail lines and in some cases, air lines.

As a rule dude ranches have come into existence through the transformation of an old cattle or horse ranch into a sort of a "back to nature" summer resort for the tourist who wants something that smacks of the wild and woolly and still wants good meals and comfortable sleeping quarters provided without any effort upon his part. Consequently the dude ranch outfit usually consists of a large rustic ranch house containing the recreation room, kitchen and dining room, surrounded by log cabins, tent houses or frame cottages.

Stables and corrals are centers of attraction where well mannered horses are kept to provide the "tenderfoot" with a mode of travel over the trails leading into the mountains and to the fishing streams. Usually each guest is assigned a particular saddle horse which he uses exclusively throughout the season. Guides are provided for long pack horse camping trips, with a cook to pitch camp and provide the meals. Often bucking contests and other rodeo stunts are staged at the corral for the entertainment of the guests.

As a general thing the meals, both in the camps and in the community dining room, are of the very best, and in some camps there is music and dancing facilities. At many, modern conveniences are provided, such as electric lights, bath houses and running hot and cold water.

There are now estimated to be over 100 dude ranches in Montana offering this typically western vacation. The largest number are found in the mountain valleys north of Yellowstone Park especially in or near the Beartooth, Absaroka and Gallatin national forests. There are also a number in the Flathead and Mission range country and several in the range country of southeastern Montana.

A directory follows:

IN FLATHEAD LAKE REGION

Dude Ranches and Mountain Camps Located Within Flathead, Lincoln, Lake and Sanders Counties.

BINKO RECREATION RANCH: In Rockies, about 70 miles south of Kalispell. Large main cabin with dining hall and assembly. Smaller furnished cabins for rent. Fishing, horseback riding, dancing, swimming, boating, hunting in season. Fresh cream, butter, eggs, garden vegetables. Address W. E. Binko, Clearwater, Montana.

BOND LODGE: At head of Swan Lake about 40 miles from Kalispell. Cabins for rent, furnished for light housekeeping if desired. Rooms in log bungalow, use of community kitchen. Fishing, boating and bathing. Address Mrs. E. C. Bond, Swan Lake, Montana.

BAR LAZY D. N. RANCH: About nine miles southwest of Glacier Park Station. Large ranch house with living, dining rooms, kitchen and sleeping quarters. Also smaller cabins and tent houses. Horseback riding, hiking, mountain climbing, swimming, fishing, hunting in season, camping with efficient guides, packers, cooks. Address A. B. Brash, Glacier Park, Montana.

BROKEN ARROW RANCH: Just south of Glacier Park Station. Furnished log cabins, central chalet containing recreation, dining rooms, kitchen. Simple, old-time ranch life is rule. Guests have own saddle horses, allowed to roam at will or join parties under lead of experienced guide. Fishing, hunting in season. Address H. M. Ralston, P. O. Box 15, Glacier Park, Montana.

APGAR'S CABIN RESORT: Located at foot of Lake McDonald, near to main road from Belton into Glacier Park. Small cabins equipped for light housekeeping. Post-office and store close to camp. Fishing, hiking, riding. Fresh vegetables, fruit, dairy products. Address H. W. Hutchings, Belton, Montana.

BOSWORTH'S CABINS: About 40 miles from Kalispell, Montana, on shores of Swan Lake. Cabins completely furnished for light housekeeping, each with screened porch. Common cold storage room, wood, light and row boat for each cabin. Horses may be hired. Fishing, hunting in season. Address Frank Bosworth, Swan Lake, Montana.

CAMP FLATHEAD: On west shore of Flathead Lake, about 2½ miles from Somers. Fully equipped cabins, community kitchen; dining rooms and living room in main cabin, also store. Fuel furnished. Hiking, riding, fishing, hunting in season. Address Mrs. J. J. MacDonald, Somers, Montana.

CAPTAIN LAIRD'S RECREATION LODGE: At Elbow Lake, head of Swan River, 85 miles north of Missoula, in Flathead National Forest. Regular trips with saddle and pack trains through Mission and Kootenai Ranges to view lakes, waterfalls and glaciers. Fishing, big game hunting in season. Address Captain Eli Laird, Seely Lake, Montana.

CEDAR ISLAND RESORT: On west shore of Flathead Lake, nearest railroad point, Somers, Montana. Main building for dining, number of sleeping rooms, also small cabin and tents. Hiking, riding, climbing, rowing, motorboating, swimming, fishing and hunting in season. Address Mrs. W. S. Jelleff, Rollins, Montana.

GOLD CAMP: On south shore of Lake McDonald, three miles north of Belton, Montana. Small hotel, number of cottages. Dance pavillion, store, postoffice, soda fountain. Swimming, boating, canoeing, hiking, tennis, fishing. Address Douglas Gold, Browning, Montana.

DOERING CAMP: On west shore of Flathead Lake about five miles south of Somers, Montana. Log cabins for rent. Excellent bathing beach. Boating, hiking, fishing. Address Fred Doering, Somers, Montana.

DEW DROP INN: Overlooking Flathead Lake at Dayton, Montana. Comfortable little hotel. Horses may be had for riding. Bathing, rowing, motorboating, fishing, hunting in season. Address Mrs. E. P. Lawrence, Dayton, Montana.

DUDE RANCH: F. L. Babcock, Proctor, Montana. Flathead Lake.

HOLLAND LAKE RESORT: On shores of Holland Lake in Swan River Valley, nearest railroad point Kalispell, Montana. About 80 miles from Missoula. Large main building containing dining room, several small cabins grouped around it. Saddle horses for rent. Bathing, boating, swimming, fishing, pack trips to Glacier Park, hunting in season. Address White and Wilhelm, Seeley Lake, Montana.

HAPPY'S INN: On Crystal Lake, 44 miles east of Libby, 53 miles west of Kalispell. In midst of chain of 13 lakes. Lobby, store, dining rooms and kitchen in main building, separate cabins for sleeping. Swimming, boating, dancing, hiking, golf, fishing and hunting in season. Address F. J. Townsend, Box 471, Libby Montana.

HIAWATHA LODGE: On Wild Horse Island in Flathead Lake, Polson nearest railroad point. Large assembly and dance hall, main dining rooms, home cooked food; log and frame cottages, nicely furnished, for sleeping quarters. Boating, golf, tennis, croquet, camping parties, excellent fishing, 12 fishing streams flowing into Flathead Lake. Hunting in season. Visits to Flathead Indians, rodeos and such. Address Clara I. Edgington, Dayton, Montana.

GLENWOOD PARK: On shores of Whitefish Lake, about one mile from Whitefish, Montana. Cottages for rent, equipped for light housekeeping. Supplies bought in White-

fish, deliveries to camp. Swimming, bathing, good fishing, hiking, pack trips may be arranged for. Address R. T. George, P. O. Box 442, Whitefish, Montana.

GLEN LAKE RESORT: Cabin and tent city. Saddle horses, hiking, and fishing. Address W. S. Mills, Eureka, Montana.

LAKE RONAN: J. J. Thomas, Proctor, Montana.

LEWIS GLACIER HOTEL: On east shore near head of Lake McDonald in Glacier Park. Nearest railroad point, Belton, Montana. Log hotel containing spacious lounging room, dining room, accommodations for about 300 people. Furnished log cabins for rent. Boating, swimming, good fishing, launch trips on Lake McDonald. Starting point for trail trips to Paradise Canyon, Trout Lake, Avalanche Basin and such. Address L. E. Stefin, Mgr., Lewis Glacier Hotel, Lake McDonald, Montana.

KOOTENAI COVE: In Kootenai Mountains overlooking Flathead Lake. Simple ranch life, fresh vegetables, dairy products. Outdoor sports, fishing, boating, bathing, hunting in season. Address Kootenai Cove, Creston, Montana.

KELLY'S CAMP: On west shore, near head of Lake McDonald. Belton, Montana, nearest railroad point. Cabins for rent furnished for light housekeeping, including wood, electricity, spring water piped to each house. Store nearby. Excellent fishing, arrangements can be made for pack trips to all parts Glacier Park. Address Frank Kelly, Belton, Montana.

HIDEAWAY LODGE: On east shore of Flathead Lake, about 40 miles from Somers, Montana. Log cabins and tents for rent. Swimming, fishing, boating, hunting in season. Address Mrs. R. Dee, Polson, Montana.

MEADOW MOUNTAIN RANCH: On shores Thompson Lakes, 28 miles from Marion, Montana. Log cabins for rent. Fishing, hunting in season, trap-shooting, hiking, climbing. Address Lloyd A Bower, Yakt Post Office via Marion, Montana.

M. LAZY V. RANCH: In heart of Rockies, 50 miles southwest of Glacier Park, about 30 miles from Kalispell, Montana. Individual log cabins for housing guests, dining and recreation rooms in large, central building. Real cattle ranch. Hiking, riding, trips to lakes within few miles of ranch where one may swim or fish. Address Mrs. A. M. Moore, M-Lazy-V Ranch, Marion, Montana.

MURPHY CAMP: Camp located at mouth of White River, about 90 miles south of Citadel. Pack trips a specialty. Parties go from Ovando to head waters of South Fork of Flathead River, in remotest part of Rockies, excellent trout fishing and hunting in season. Address Jos. B. Murphy, Ovando, Montana.

MONK'S BAY RANCH: One east shore of Whitefish Lake about three miles from Whitefish, Montana. Large, modern cottage. Hiking, riding, good fishing. Address J. A. Monk, Whitefish, Montana.

LAKE McDONALD CAMP: On south shore of Lake McDonald in Glacier Park, nearest railroad point. Belton, Montana. Large central lodge with dining room, a club house with large porches facing lake, dance floor, curio shop, post office. Smaller cabins for rent either for lodging or light housekeeping. Good fishing, hunting in season. Access to all Park saddle horse and motor trips. Address Gold Brothers, Mgrs., Lake McDonald Camp, Belton, Montana.

PINE PRAIRIE RANCH: In Bitter Root Mountains. Marion, Montana, nearest railroad point. Log bungalow, one and two room cabins. Fishing, free riding lessons, outdoor sports. Address Mrs. M. A. Moore, Marion, Montana.

MICKY WAGNER'S RANCH: About 10 miles from Lake McDonald, nearest railroad point Coram, Montana. Cabin and tents. Hiking, fishing, riding, camping trips, hunting in season. Address Micky Wagner, Coram, Montana.

DOCKY BAR O RANCH: On east shore of Flathead Lake about 30 miles from Kalispell, Montana. Log cabins for rent. Horses and guides available for short or long trips into surrounding mountains. Good fishing, swimming, hiking. Address Florence Rogers Cassill, 6022 25th N. E., Seattle, Washington.

REST HAVEN: On east shore of Whitefish Lake about four miles from Whitefish, Montana. Clubhouse for dancing and recreational purposes. Cottages for rent, equipped for light housekeeping if desired. Restaurant operated in conjunction with camp. Horses and guides may be obtained. Boating, swimming, tennis, fishing, hunting in season. Address Father Joseph J. Carroll, Rest Haven, Whitefish, Montana.

RETIRO CABINS: On south shore of Lake Five about three miles from Belton, Montana. Log cabins rented for light housekeeping. Main building also. Fishing, hunting in season. Address J. H. Ridenour, Lake Five, Montana.

SKYLAND CAMPS: On shores of Bowman Lake in west side of Glacier Park, about 40 miles from Belton, Montana. Log chalet for dining and assembly purposes, smaller cabins and tent houses for sleeping. Horses and guides available. Trips to Quartz and Kintla Lakes, famous "Hole-in-the-Wall" country may be arranged for, also temporary camps on Lower or Upper Kintla Lakes. Good fishing. Address Skyland Camps, Belton, Montana.

SPOTTED BEAR LODGE: In heart of Flathead National Forest about 76 miles east of Kalispell. Saddle horses and guides available. Hiking, riding, fishing, hunting in season. Address Guy Clatterbuck, Kalispell, Montana.

SHINING MOUNTAIN CAMP: On Flathead Lake, adjacent to western entrance to Glacier Park. Girls' Camp. Carefully chaperoned at all times. Each girl provided with horse and equipment. Swimming, hiking, riding. Trip through Glacier Park. Address Florence Rogers Cassill, 6022 25th N. E., Seattle, Washington.

STONER HOTEL: Small comfortable hotel. Fishing, riding, hiking, bathing, boating, dancing. Address Fred Doering, Somers, Montana.

WARNER'S DUDE RANCH: On Kootenai River, saddle horses, big game hunting in season. Log cabins and tents, separate dining room. Dance pavilion. Hiking, fishing. Nearest railroad point, Libby, Montana. Address J. Western Warner, Libby, Montana.

VANCE'S LODGE: On North Fork of Flathead River, western boundary of Glacier Park. Nearest railroad point, Belton, Montana. Comfortable, large log house. Eight lakes within radius of 15 miles of camp. Hiking, riding, good fishing, hunting in season. Address Mrs. A. G. Vance, Polebridge, Montana.

TEE BAR RANCH: On high bench land about 25 miles from Somers, Montana. Log cabins for rent. Main building contains kitchen and dining rooms, table bountifully supplied with fresh vegetables, small fruits, dairy products. Opportunities to ride, to camp out, to see different cattle and horse roundups. Water sports on Flathead Lake, good fishing, special pack trip may be made to National Buffalo Range at Dixon. Address Ledoux, Davis and Longpre, Tee Bar Ranch, Big Arm, Montana.

FOREST MEADOWS: On Thompson River about 44 miles from Marion, Montana. Dining room and kitchen in centrally located cabin. Tent houses and cabins for sleeping. Good food. Boating, hiking, swimming, riding, tennis, fishing and hunting in season. Address Victor Stobie, Forest Meadows, Plains, Montana.

STOBIE CAMP: On Big Thompson River. Plains, Montana, nearest railroad point. Cabins and tents for rent. Separate rooms for dining, dancing and recreation. Saddle horses for rent. Fishing, riding, hunting in season. Address Victor Stobie, Plains, Montana.

SEVEN-UP RANCH: Near Lincoln, 60 miles north of Helena, on the Big Blackfoot river. Comfortable cabins equipped with stoves. Central recreation hall and a separate dining room. Scenic attractions, mountain streams, heavy timber, snow-capped peaks. Hunting and fishing in season. Saddle horses are provided and pack train expeditions may be organized from the ranch. Address communications to Seven-Up Ranch, J. E. Bower, Manager, Lincoln, Montana.

Hotels, Chalets, Camps in Glacier Park.

GLACIER PARK HOTEL: Located at Glacier Park station, eastern entrance to Park. Electric lighted, steam heated, absolutely modern hotel.

MANY GLACIER HOTEL: On east shore of McDermott Lake, 55 miles from Glacier Park Station. Modern in every respect.

PRINCE OF WALES HOTEL: Located on the Narrows of Waterton Lake, just over International bountary, also modern in every respect.

TWO MEDICINE CHALETS: On lower end Two Medicine Lake, reached by automobile, horseback or afoot from Glacier Park Hotel.

CUT BANK CHALETS: In Cut Bank valley 22 miles from Glacier Park Station. Good fishing.

ST. MARY'S CHALETS: On south shore near lower end of St. Mary's Lake, 32 miles from Glacier Park Station. Good fishing at Red Eagle Lake 8 miles away.

GOING-TO-THE-SUN CHALETS: On northwest shore of St. Mary's Lake at foot of Going-to-the-Sun Mountain. Reached by boat or trail from St. Mary's Chalets.

MANY GLACIER CHALETS: On northeast shore of Lake McDermott, less than mile from Many Glacier Hotel which is 55 miles from Glacier Park Station. Operated as part of Many Glacier Hotel, furnishes lodging only.

GRANITE PARK CHALETS: On west side of Continental Divide 9 miles by trail from Many Glacier Hotel. Reached only by horseback or afoot.

SPERRY GLACIER CHALETS: In Sperry Glacier Basin on west side of Continental Divide about 9 miles from head of Lake McDonald. Reached only by horseback or afoot from either Lake McDonald or Going-to-the-Sun Chalets.

Park Saddle Horse Company.

FIFTY MOUNTAIN CAMP: Near top of Continental Divide, on slopes of Flattop Mountain, just west of Mount Kipp. Reached only by trail from Granite Park, Lake McDonald and Waterton Lake.

GOATHAUNT CAMP: Near upper end of Waterton Lake, at foot of Goathaunt Mountain. Reached only by horseback from Granite Park, Fifty Mountain Camp or by boat from Prince of Wales Hotel.

CROSSLEY LAKE CAMP: On north shore of Crossley Lake in northeast portion of Park. Reached by horseback from Goathaunt Camp or Many Glacier Hotel.

Dude Ranches and Mountain Camps Within Blaine, Glacier, and Teton Counties.

CAMP TUFFIT: On shores of Lake Mary, about 30 miles from Somers, Montana. Large central hotel, number of small log cabins. Some furnished for light housekeeping. Excellent fishing, horseback riding, hiking, swimming, rowing and motoring. Address C. H. Thomas, Proctor, Montana.

CHICK GRIMSLEY CAMP: About 20 miles west of Bynum, Montana. Headquarters for camping trips into mountains and over Continental Divide. Tent and log cabin accommodations. Good hunting in season, and fishing. Address Chick Grimsley, Bynum, Montana.

TWO MEDICINE RANCH: On Two Medicine River about four miles from Glacier Park Station. Comfortable accommodations, wholesome food, good horses. Hunting and fishing trips into Rockies handled by skilled woodsmen. Address Geo. T. Mollander, Glacier Park, Montana.

BUFFALO HEAD RANCH: On east shore of lower St. Mary's Lake. Small log cabins, also larger main cabin containing lobby and dining room. Hiking, riding, fishing, hunting in season. Pack train trips arranged to all parts of Park and points south. Address William C. Gird, Babb, Montana.

JENNINGS RANCH: On shoulder main range Rockies, six miles south Glacier Park Station, Montana, at eastern gateway Spotted Bear game country. Log cabins and tent houses for rent. Fresh vegetables and dairy products. Riding, trips across Continental Divide to south Fork of Flathead. Hunting in season. Address George H. Jennings, Glacier Park, Montana.

OLNEY'S RANCH: On banks north fork of Teton River about 25 miles from Choteau, Montana. Tents and log cabins for guests, primarily base of operations for camping and packing trips into mountains. Good fishing, hunting in season. Address O. R. Olney, P. O. Box 372, Choteau, Montana.

FOSTER RANCH: In Blackfeet Reservation, four and one-half miles from Glacier Park Station. Kitchen and eating cabins. House tents for sleeping. Plain but wholesome food. Typical western ranch life. Good camp for boys. Tutoring in school and college subjects. Address Chas. R. Foster, University School, Cleveland, Ohio.

HUGHES AND CONNERS: Specialize in pack horse camping trips into Rockies to south of Glacier Park. Fifty head, good, easy riding saddle horses. Complete equipment for camping or hunting trips. Good fishing. Address Hughes and Conners, Glacier Park, Montana.

ROCK SPRING RANCH: Among hills near Milk River, just north of Haro, Montana. Tent and log cabins for rent. Saddle horses for rent. Fishing in Milk River and streams adjacent to ranch. Hunting in season. Address E. S. Rich, Coburg, Montana.

Dude Ranches and Mountain Camps Within Granite, Mineral, Missoula, Powell and Ravalli Counties.

HAPPY HOLLOW RANCH: In Bitter Root Mountains, nearest railroad point Quartz, Montana. Main ranch house, cabins, tents if desired. Horses for rent. Hiking, good fishing in nearby rivers and streams. Hunting in season. Address Dodson and Loush, Tarkio, Montana.

ACUFF'S RANCH: On South Fork of Flathead River about 35 miles east of Missoula, Montana. Rough cabins but clean beds, hearty food. Saddle horses for rent. Good fishing, hunting in season. Address Walter Acuff, Ovando, Montana.

EDGEWOOD RANCH: Near Blackfoot River about 35 miles northeast of Missoula, Montana. Large ranch house, log cabins and tents. Saddle horses for rent. Hiking, good fishing, hunting in season. Address J. L. Pitkin, Ovando, Montana.

BRIGGS RANCH: On Bitter Root River in Rocky Mountains about 65 miles from Missoula, Montana. Modern house, log cabins and tents. Horses for rent. Excellent board. Good fishing, trips into wild mountains, hunting in season. Address H. A. Briggs, Darby, Montana.

COTTONWOOD STOCK FARM: Large cattle and dairy ranch about 30 miles southeast of Missoula, Montana. Large main ranch house, small houses and tent houses. Good fishing in nearby streams. Hiking, riding, trips into mountains, forests, to warm springs, lakes and such. Hunting in season. Address Henry Thayer, Bearmouth, Montana.

TAMARACK RANCH: About 37 miles from Missoula, Montana. Log cabins and tent houses. Saddle horses, pack horses for rent. Fishing in nearby creeks, camping, hunting in season. Address Edward Brown, Fish Creek, Lolo Hot Springs, Montana.

E BAR L RANCH: At junction of the Clearwater and Blackfoot Rivers. In Blackfoot country. Main ranch house with dining and lounge room. Smaller cabins for guests. Fishing, riding, hunting in season. Address E Bar L Ranch, Greenough, Montana.

Dude Ranches and Mountain Camps In Cascade, Fergus, Lewis and Clark and Meagher Counties.

ALLAN RANCH: Located about 25 miles from Augusta. Main cabin used for dining and recreation, small cabins for sleeping quarters. Warm plunge. Trips on horseback

to beaver workings, waterfalls, caves and such. Dancing. Fresh vegetables and dairy products. Pack trips can be arranged for. Address Ralph Allan, Augusta, Montana.

SUN RIVER CAMP: Near Sun River about 30 miles from Salmon Lake, nearest railroad point Gilman, Montana. Log cabin for dining, tents for sleeping. Dance hall. Sun River Springs for bathing nearby. Horses for rent. Good fishing, hiking, hunting in season, boating on Salmon Lake. Address White and Nixon, Augusta, Montana.

ALT RANCH: Nearest railroad point Wolf Creek, Montana. Attractive, modern house, also tents. Reservoir nearby for swimming. Good fishing in streams and lakes within short distance. Hiking, mountain climbing, short and long camping trips. Hunting in season. Address Anton Alt and Sons, Wolf Creek, Montana.

TWIN SPRINGS HUNTING AND FISHING LODGE: Fen Cook, Martinsdale, Montana.

BIG GEORGE BASIN RANCH: Near Sun River, about 40 miles from Salmon Lake, nearest railroad point Augusta, Montana. Log cabins and tents for rent. Saddle horses for rent. Hiking, fishing in lakes and streams in surrounding regions. Camping trips may be arranged for. Hunting in season. Address Stephen Matthew, Augusta, Montana.

ROCK HILL RANCH: In the foothills of Belt Mountains about 15 miles from Neihart, Montana. Large main building, smaller adjoining cabins. Saddle horses for rent. Dancing, hiking, fishing, hunting in season, tennis, target shooting. Address Chas. Dreibelbis, Barzee, Montana.

CAMP LINCOLN: In main range of Rockies, headwaters of Big Blackfoot River, about 38 miles from Silver, Montana. Main hotel and dining room, log cabins for rent. Dance pavillion. Riding, pack trips, good fishing and hunting in season. Address L. J. Lambkin, Camp Lincoln, Lincoln, Montana.

BRUCKERT RANCH: About 16 miles west of Augusta, Montana. On banks Willow Creek. Central log cabin with big open porch, dining and recreation rooms, sleeping quarters in smaller adjacent cabins and tent houses. Fishing, hunting in season, hiking. Address Henry Bruckert, Augusta, Montana.

CURLEY DUNLAP'S DUDE RANCH: In heart of Snowy Mountains, some 18 miles southeast of Lewistown. Old cattle ranch. Large ranch cabin for dining and recreation purposes, small cabins and tents for sleeping. Rodeo held each Sunday. Horseback riding, hiking, fishing and hunting in season. Address Curley Dunlap, Lewistown, Montana.

LONE CHIEF RESORT: In Elk Creek Canyon about 14 miles from Augusta, Montana. Cabins for rent. Mineral spring under development. Fresh vegetables, berries, dairy products. Good trout fishing, hunting in season, riding, short trips or longer trips across Divide toward Glacier Park. Address Fern Cooke, Box 38, Augusta, Montana.

MOUNTAIN VIEW RANCH CAMP: In upper end of the Sun River valley about two miles from town of Augusta, Montana. Old established cattle ranch. Boys' camp. College men experienced in camp life in charge. Riding, trips made to explore streams, lakes, caves, across Divide to mountain camp, fishing. Address H. B. Sallee, Augusta, Montana.

STECKER RANCH: In Sun River Canyon about 20 miles from Augusta, Montana. Main ranch used as headquarters for saddle and pack horse trips into mountains. Log cabins and tent houses rented for light housekeeping. Pack trips into mountains along Wood Creek and over Divide to Salmon Lake. Fishing, hunting in season. Address W. H. Stecker, Stecker Ranch, Augusta, Montana.

RABICHAUD HOTEL: In heart of Belt Mountains, near Neihart, Montana. Small, modern hotel. Fishing, hunting in season. Address Mrs. J. Rabichaud, Neihart, Montana.

DU RAND RANCH: Martinsdale, Montana.

Dude Ranches and Mountain Camps in Beaverhead, Madison and Silver Bow Counties.

ELLIOTT'S CAMP: On east end of Wade Lake 70 miles south of Norris. Cabins for rent. Guests do own cooking. Good fishing. Address G. C. Elliott, Cliff Lake, Montana.

GRAYLING INN: On Red Canyon Creek, about 15 miles north of West Yellowstone, Montana; Norris, nearest railroad point. Large ranch house and several smaller cabins. Fishing, hunting in season. Address P. Kerzenmacher, Grayling, Montana.

HALFORD'S CAMP: In Madison Canyon at head of Beaver Creek. Norris, Montana, about 80 miles south. Dining room and lobby in main building, other smaller cabins. Good fishing, hunting in season. Address Arthur Smith, Cliff Lake, Montana.

HUTCHINS' RANCH OR MOUNTAIN HOME: On banks of Madison River, about 40 miles from Ennis, Montana. Main log building, number smaller cottages. Saddle horses for rent. Nearest railroad point, Norris. Good fishing and hunting in season. Address I. A. Hutchins, Lyon, Montana.

HARRIS INN: About 100 feet from Madison Lake, half a mile from Madison River, between McAllister and Norris, Montana. Comfortable main lodge, home cooked food, number small cabins furnished for light housekeeping. Near Thompson Hot Springs. Fishing, boats available for duck hunting in season. Address Mr. Jake Harris, McAllister, Montana.

NEELY'S CAMP: On east arm of Cliff Lake about 70 miles from Norris, Montana. Main dwelling, other smaller cabins for rent. Hiking, good fishing. Address Neely's, Cliff Lake, Montana.

RUBY VALLEY RANCH COMPANY: A. H. Perz, Box 223, Twin Bridges, Montana.

SKYLINE LODGE: In upper reaches of Birch Creek Canyon on shoreline of Pear Lake, Beaverhead National Forest about 75 miles southwest of Butte, Montana; nearest railroad point, Apex. Main dining hall and assembly hall. Individual cabins or tent houses if preferred. Good fishing, five lakes, three trout creeks, mountains, natural cave all in easy reach of camp. Saddle and pack horses provided. Address Skyline Lodge, American Legion Hall, Butte, Montana.

SHAW'S CAMPS: On edge of historic mountain mining camp, Cooke City. Gardiner nearest railroad point. Main building contains lobby, dining and recreation halls. Log cabins for sleeping. Saddle horse trips into Beartooth and Absaroka Mountains, to Grasshopper Glacier, Lulu Pass and such. Good fishing in lakes and streams. Address Mrs. Walter Shaw, Shaw's Hotel, Gardiner, Montana.

SPRAGUE RANCH: On Madison River on east side Tobacco Root Range, 42 miles from Yellowstone Park. Norris, Montana, nearest railroad point. Cabins for rent. Separate dining room and large porch. Hot springs plunge within four miles. Saddle horses for rent. Riding, hiking, good fishing, hunting in season, boating on Cliff and Wade Lakes, Address R. H. Sprague, Lyon, Montana.

SPEAR RANCH: Sheridan, Madison county, Montana.

Dude Ranches and Mountain Camps Within Carbon, Gallatin, Park, Stillwater, Sweet Grass and Yellowstone Counties.

BENHAM CAMP: In Gallatin canyon, about halfway between Bozeman and West Yellowstone. Log cabins for rent. Large main dining room. Fishing, hunting in season, pack trips into surrounding country. Address Earl H. Benham, Salesville, Montana.

BOULDER LODGE: Near Contact, Montana, in Absaroka National Forest. Main building with living, dining rooms and kitchen, other smaller cabins. Saddle horses for rent. Fishing, hiking, mountain climbing, hunting in season. Trips arranged into "back country." Address Gerald M. Kirwan, Contact, via Big Timber, Montana.

BEARTOOTH RANCH: In Stillwater canyon, about four miles within boundary of Beartooth National Forest, 30 miles from Yellowstone Park, 45 miles from Columbus. Large main cabin, smaller cabins and house tents also available. Boating, fishing, hiking, saddle horse trips, pack trips, big game hunting in season. Address W. Roy Hicox, Camp Beartooth, via Red Lodge, Montana.

CAMP SENIA: About 15 miles west of Red Lodge in the Beartooth National Forest, Silver Run Mountain towering above it. Log cabins, bungalow tents clustering around main building containing reading room, store, club room, large open porch. Dining room and kitchen separate buildings. All furniture rough-hewn from pine and hickory. Accommodations for approximately 175 guests. Fresh vegetables, dairy products. Lakes Gertrude, Timberline, Mary, Crow and Shipp all within few miles of camp. Saddle horses for rent. Pack trips may be arranged to Grasshopper, Windy Gap, Castle Rock Glaciers and other famous scenic features. Good fishing, hunting in season. Address A. H. Crconquist, Camp Senia, via Red Lodge, Montana.

CASTLE ROCK RANCH: Pryor Gap near Billings. H. J. Burch and Dale Pettie.

DONALD CABIN RESORT: Near Melville, Montana. Comfortably furnished cabins for rent, light housekeeping if preferred. Saddle horses rented. Vegetables, dairy products may be bought at main ranch cabin. Good fishing. Address Alma Donald, Donald Ranch, Melville, Montana.

ELK HORN RANCH: About 60 miles up west Gallatin River from Bozeman, Montana. Cabins for rent, main dining hall. Horseback riding, fishing, hunting in season, hiking, pack trips into mountains, including part of Yellowstone Park. Address E. C. Miller, Elkhorn Ranch, Bozeman, Montana.

FLYING "H" RANCH: On upper Stillwater River near Fishtail, reached from Columbus, Montana; 25 miles from Yellowstone Park. Large dining room, lobby, sun porch, cabins and tent houses for sleeping. Dance hall. Fishing, horseback riding, trips to Mystic, Crater and Emerald Lakes. Black, Midnight and Bad Canyons. Big game in season. Address Alfred H. Clarke, Fishtail, Montana.

GALLATIN WAY RANCH: In Gallatin Valley, within short distance of Gallatin River. Nearest railroad point, Bozeman. Cabins for rent. Hiking, riding, packtrips, good fishing. Address Victor H. Benson, Gallatin Way Ranch Co., Eldridge, Montana.

HART-BAR-T RANCH. Near Contact, Montana, Boulder River flows through ranch grounds. Big Timber nearest railroad point. Log cabins and tents for rent. Saddle horses for rent. Good fishing. Pack trips into Beartooths, Grasshopper Glacier, Yellowstone Park. Hunting in season. Address B. A. Fleming, Contact, Montana.

HALF-WAY INN: Gallatin River flows through ranch, about 50 miles from Bozeman, Montana. Only 13 miles from west corner Yellowstone Park. Log cabins and tents for rent, separate dining room. Saddle horses for rent. Trips to Park, Spanish and

Taylor Peaks, Buffalo Horn Lakes and such. Good fishing, hunting in season. Address R. B. Lemon, Salesville, Montana.

KARST'S DUDE RANCH: On Gallatin River, 36 miles from Bozeman, Montana. Equipped to entertain 250 guests. Hiking, swimming, fishing, hunting in season, tennis, archery, dancing and riding. Trips to Lava Lake, Windy Pass, Jumbo Mt., the petrified trees, even to Yellowstone Park. Address P. F. Karst, Gallatin Gateway, Montana.

LAZY K BAR RANCH: In mountains near Big Timber, Montana. Large log building contains living room, library, pool table and dining room; also assembly and dance hall. Smaller furnished cabins for sleeping. Riding, pack trips to mountains and lakes where trout fishing is good. Broncho-busting, calf-roping, bull-dogging steers regular parts of ranch work. Hunting in season. Address Paul Van Cleve, Jr., Big Timber, Montana.

MIDDLE CREEK CANYON RANCH: G. W. Flanders, Bozeman, Montana.

OLD KAINTUCK CAMP: At foot of Contact Mountain on Boulder River about 30 miles from Big Timber, Montana. Main building, dining room, smaller separate cabins. Saddle horses for rent. Hiking, riding, good trout fishing, hunting in season. Address W. G. Aller, Contact, Montana.

O-T-O RANCH: Adjacent to north entrance Yellowstone Park, at edge of Absaroka National Forest. Pack trips, saddle horse tours through Yellowstone Park a specialty. Day trips to Castle Cliffs, Devil's Slide, Hell's Hole, Black Mountain and such. Large main cabin with living room, trophy den, pool room, dining room, kitchen. Separate cabins if desired. Good meals. Fresh vegetables and dairy products. Fishing, dancing, hiking, climbing, hunting in season. Address Dick Randall, O-T-O Ranch, Corwin Springs, Montana.

PARKER'S RANCH: Northern boundary Yellowstone Park; Gardiner, Montana, nearest railroad point. Main ranch cabin with dining room, other comfortable log cabins, large and small. Mammoth Hot Springs, Yellowstone Park, in full view ten miles to south. Saddle horses for rent. Winter camp as well as summer. Fishing, hunting in season. Address James W. Parker, Gardiner, Montana.

PINE CREST RANCH: At head of Butcher Creek, foothills of Beartooth Mountains. Log cabins for rent. Meals at ranch house. About 22 miles northwest of Red Lodge, Montana. Pack horses for rent. Pack trips into mountains, to Timber, Crow and Sylvan Lakes. Riding, fishing, hunting in season. Address L. W. Rankin, Luther, Montana.

RICHELL LODGE: In Beartocth country, 60 miles from Yellowstone Park, Red Lodge, Montana, nearest railroad point. Main lodge, also cabins for light housekeeping. State Fish Hatchery near. Within radius of about 20 miles are 50 lakes. Climbing, camping, dancing, hunting in season, good fishing, riding. Address Mrs. Herbert Richel, Richel Lodge, Red Lodge, Montana.

SAWTOOTH CAMP: In Beartooth Forest, Red Lodge nearest railroad point. Log building for dining room and lounge, tents with log base and floors, small cabins for sleeping. Excellent fishing, riding, trips into mountains, to see waterfalls, sheer cliffs and such. Good food. Address F. I. Johnson, Red Lodge, Montana.

THREE BEARS INN: At entrance to Bridger Canyon at foot of lofty mountain about five miles from Bozeman, Montana. Comfortable Inn, log cabins for rent furnished for light housekeeping. Saddle horses for rent. Good fishing in nearby lakes and streams. Address Mignon Quaw Lott, Bozeman, Montana.

TEE-O-BAR RANCH: On East Rosebud Lake, near East Rosebud River, about 35 miles from Columbus, Montana. Log cabins and log hotel. Skillful guides, good fishing, saddle horses, big game hunting in season, trips into wild Beartooth country and even to Yellowstone Park. Address John Branger & Sons, Inc., Tee-O-Bar Ranch, Alpine, Montana.

WHITE BEAR RANCH: On Boulder River about 35 miles from Big Timber, Montana. Log cabins, separate dining room, natural hot water plunge. Saddle horses for rent. Excellent fishing, tennis, target-shooting, hunting in season. Trips may be arranged for. Address Mrs. C. M. Loring, Contact, Montana.

WILSON: Salesville, Montana, mouth of Taylor's Fork.

WILSON'S CAMP: In Gallatin Canyon halfway between Bozeman and West Yellowstone, not far from Yellowstone Park. Saddle horses available for trips to Petrified Forest, Sinking Forest, Big Horn Mountains and such. Good fishing, hunting in season. Address S. M. Wilson, Eldridge, Montana.

WILLMAN RANCH: On main branch of Boulder River, nearest railroad point, Big Timber, Montana. Log cabins and tents for rent. Saddle horses for rent. Fishing, big game hunting in season. Address W. M. Willman, Willman Ranch, Contact, Montana.

320 RANCH: In Gallatin Canyon, 54 miles from Bozeman, 9 miles from Yellowstone Park. In Gallatin National Forest, facing West Gallatin River. Dining and recreation rooms in separate log houses, smaller log cabins for sleeping. Special camp for girls also maintained. Good fishing, good saddle horses, hunting in season. Address Luke Brown, 320 Ranch, Eldridge, Montana.

Dude Ranches and Mountain Camps Within Big Horn, Custer and Rosebud Counties.

BONES BROS. RANCH: In rugged Big Horn country, two and one-half miles from Birney, 60 miles from Sheridan, nearest railroad point. Old-time cattle and horse ranch. Big main cabin, with dining, living and billiard rooms, smaller cabins also. Riding and fishing. Opportunities to see branding and shipping of cattle, breaking of wild horses. Address Bones Brothers, Birney, Montana.

BREWSTER BROS. DUDE RANCH: New railroad from Miles City to Casper will cross ranch for about seven miles.

LONE WOLF RANCH: On Crow Indian Reservation, at foot of Pryor Mountains, on Little Pryor River, 45 miles south of Billings. Main ranch building with large dining room. Fresh meats, dairy products, fruits and vegetables. Smaller log cabins for sleeping quarters. Dancing, fishing, riding, trips to canyons and caves. Every two weeks Indians put on sports program. Address Mrs. Charles Phelps, Box 25, Pryor, Montana.

QUARTER CIRCLE-U RANCH: In Tongue River Valley, nearest railroad point Forsyth, Montana. Modern house, also tent houses. Separate dining and assembly rooms. Dancing, hiking, riding, trips to roundups, Cheyenne Indian Reservation and such, hunting in season. Address Mrs. John Arnold, Birney, Montana.

ROSEBUD RANCH: On Rosebud and Indian Creeks, in Rosebud Mountains. Adjoins Crow Indian Reservation on west, within six miles of Cheyenne Indian Reservation. Regular western cattle ranch, range riding, round-up branding and such. Fishing, riding, camping trips to Big Horns, Sheep Canyon, Black Canyon. Address Mrs. W. W. Johnson, Rosebud Ranch, Kirby, Montana.

POSING IN YELLOWSTONE PARK

YELLOWSTONE NATIONAL PARK

More Than 200,000 Visitors Through American Wonderland in 1927 Season—Administration and Special Attractions Outlined.

Yellowstone National Park has become an American institution. Every year increasing numbers pour through the gates of its six entrances during the summer months. They come for sight-seeing, for study and for rest and gain, in addition, an idea of America and Montana they could get in no other way.

The park was created for the benefit of the people; it is administered for the benefit of the people, and though a person should view every glacier, every rock formation and mountain lake or stream he would not know Yellowstone if he did not understand the framework of service that makes the complete enjoyment of the park possible.

Administration of the Park.

The park is under the control and supervision of the National Park Service of the United States Department of the Interior. In direct charge is the superintendent with offices at Mammoth Hot Springs, five miles from the north or Gardiner entrance. This is the official headquarters for the ranger service, and is also used as a central office location by the public utilities companies which operate in the park. An official bureau of information is located near the superintendent's office for the free use of tourists. A museum of natural history of the park is maintained in connection with the bureau.

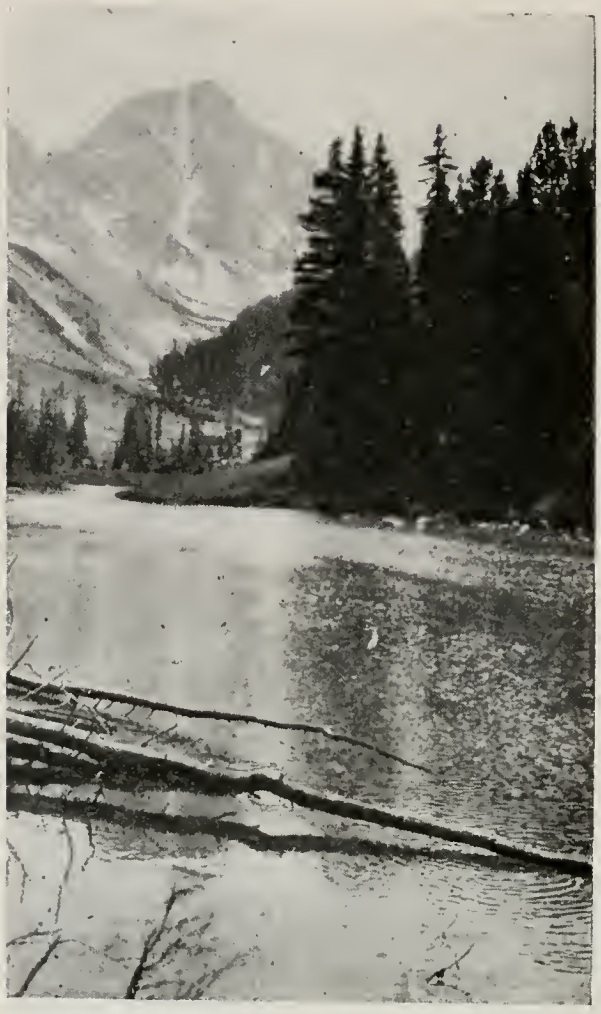
Ranger Service.

Under the direction of the superintendent a permanent ranger force is maintained, composed of men who are skilled in forest-fire fighting and trained to enforce the rules and regulations of the park. In the summer season the force is augmented by temporary rangers whose special duty it is to protect the natural features of the park from depredations by thoughtless and careless tourists. The features of the park from depredations by thoughtless and careless tourists. The rangers act in the capacity of hosts to park visitors by giving out information, answering questions and guiding.

Roads.

There are about 360 miles of roadway in the park, 165 of which comprise the main loop and are completely surfaced. During the season of 1927 a new road program was laid out, which calls for an expenditure of $10,000,000, half of that sum to be used during the next five years. The aim of the program is to bring the entire road system of Yellowstone up to the accepted high standards of the United States bureau of roads. Park highways will be surfaced, and steep grades and sharp curvatures eliminated. All the more frequented roads are being treated with an oil surface to eliminate the dust nuisance.

In addition to the surfaced highways which outline the standard motor tours of the park a trail system for horseback riders and hikers leads to



CARBON COUNTY FISHING STREAM

out of-the-way scenic sections and additional natural wonders. For the benefit of the nature lover and botanical student "the Nature Trail" was established in the summer of 1927 with markers where the wild life of the park can best be studied.

The Hotels and Camps.

All hotel and camp service is under the supervision of the government as is motor transportation. There are four hote s, and five permanent camps located with special reference to their convenience for sightseeing. The Yellowstone Park Transportation Company, under contract with the government, operates a line between the entrances and the various hotels, lodge groups and points of interest.

The buildings of both hotels and permanent camps are unique in structure, fitting in beautifully with the surroundings of mountain, forest and stream. Hotels have all modern equipment and are spacious and comfortable. The camps consist of central service building, (including a dining hall, and curio shop) and scores of cozy sleeping lodges. Improvements are being made every year in the accommodations offered visitors. During the summers 1927 and 1928 additions were built to two of the most famous hotels, Old Faithful and Mammoth.

The history of the park and a brief description by Barbara Ann Scharr in the last Montana Book, reads:

"More than one hundred years have passed since Colter viewed Yellowstone Park, first of all, and wondered at it; and none, save the Mind of the Infinite Creator, has knowledge of how long before that time it had been in existence—three thousand three hundred and forty-eight square mi es of tinted, seething muds; spectacular, spasmodic geysers; shimmering, delicate'y shaded lakes; steaming, turbulent pools; leaping, mist-hung waterfalls; brilliant sands and terraces; and gala flowers, hedged in by infinitely builded mountains, deeply gorged plateaus and ve vet-like woodlands wherein beasts and birds of remaining primitive ways find seclusion even today.

"Man wonders if God, perhaps, did not here set his forces to work far in the distant past so that when civilization did finally chance upon it it would have grown to increased, intrinsic beauty; and, apparently, it is still shaping itself for with each ensuing year it takes on added charm and individuality, several new and variant formations having burst into prominence during the past spring, as a consequence of which "Black Growler," a treacherous gulf of tossing, roaring mud and steam, now has a twin brother, "Red Growler," and can no longer claim exclusive attraction on that point. Likewise, other of Yellowstone's prodigies will be forced in the future to exert greater effort in exhibition if they are to maintain their first glorious reputations.

"It would seem as one stands in the midst of the incensed, unceasing turmoil of this vast, tumultuous region that each phenomenon were striving to outdo the other and one wonders—is there no end?—will they not some day suddenly cease, exhausted, spent? But countless ages will come and go while the mighty works of Yellowstone still prevail."

The Park.

In spite of the complete and modern service briefly described above, the sense of "nature in the original" is nowhere destroyed. The most interesting spot in all the scenic west is still in a state of unspoiled beauty, rugged and untamed.

Yellowstone has been said to have a nearly-perfect climate. During the tourist season the mean average temperature ranges from 54° to 64° with a maximum of 88°. The central portion is essentially a broad, elevated, volcanic plateau, between 7,000 and 8,500 feet above sea level, and with an average elevation of about 8,000 feet. Surrounding the central plateau on the south, east, north and northwest are mountain ranges with culminating peaks and ridges rising from 2,000 to 4,000 feet above the general level of the inclosed table-land.

The entire region is volcanic. Positive evidence of volcanic origin is apparent in the black glass of Obsidian Cliff, the whorled and contorted lavas along the road near the top of Mount Washburn, and the decomposed colored sands in the sides and depths of the Grand Canyon.

The Geysers.

"Assembled within the area of Yellowstone Park one hundred geysers, more than in all the rest of the world combined, come into play—some fitfully, some regularly—but all with that unspeakable awful force and beauty which halts the human heart to know that he, even the most egotistical, is less than one flake of dust in the eternal workings of the universe," says Miss Scharr's article.

"Old Faithful—faithful yesterday, today and tomorrow—breaks forth regularly about every seventy minutes in a wide, pillar-like volume, topped by colored, rolling clouds of steam and draped to earthward by falling, rainbow sprays—the most renowned and splendid geyser in existence. At night for the entertainment of guests a huge searchlight plays from the roof of the Inn upon the spectral, hissing eruption of Old Faithful Geyser, perfecting a sight never to be witnessed elsewhere. (See full page photograph, this section.)

"Other geysers in Yellowstone, the Beehive, Daisy, Giantess, Grand, Castle, Grotto—one hundred or more of them, all spurting, fuming, playing in the unending schedule of Nature's program seize the bystander with as many rapidly changing emotions as are they variant in form and color, and are but one of Yellowstone's fascinations."

Geysers occur where the internal heat of the earth approaches close to the surface. The five geyser basins of the park lie in the west and southcentral portions. Three of these, the Norris, the Lower and Upper Basins contain the most important geysers, but other hot-water manifestations occur at more widely separated points. Hot springs and mud volcanoes, and many-colored terraces over which pour continual streams of hot water are among the phenomena which form an almost uncanny contrast to wooded and otherwise quite normal landscapes.

Scenic Beauty.

If there were no geysers and other such "freaks" of nature, the scenic beauty of Yellowstone would be enough to form the basis for a national park. In very few places do the Rockies display greater splendor of form and size. High up in the white peaks the rivers of the west have their beginnings and rushing mountain streams and charming lakes are not the least of park attractions.

On the mountain sides and along the plateau roadways are dense forests of pine, spruce, fir, cedar, poplar, and aspen.

But greatest of all for sheer beauty and grandeur, the Grand Canyon of the Yellowstone, is the climax of the park.

Inspiration Point in this beautiful canyon was, indeed, rightfully named for from here the eye looks down twelve hundred feet onto the narrow, although only seemingly so, green, winding way of the Yellowstone River, banked on either side by massive, rising walls of kaleidoscopic beauty which have never been surpassed in natural revelation by any spot on the globe. Walls—castellated, slashed, etched, fissured, niched and torn by time, and as beautifully colored as they are broken, reflect beyond the power of human description or artist's brush hues, vivid and resplendent, which here give radiance to the very sky instead of the blue of heaven being lent to them. Shadows of the cloudland o'erhead and of scattered, weathered trees hung on the harrowing walls of the mighty canyon play in and out among the prismatic fleeting and returning colors and reflections

—ochre, sapphire, ruby, gray, green, gold, violet, orange, mingled with bright and delicate shades, unnamed. And, at the head of the canyon, as though its supreme beauty alone were not enough to completely dazzle man, there breaks into sudden play the Big Falls of the Yellowstone, dropping with sheer violence to depths three hundred feet below—a massive, tumbling flood of feather-sprayed, roaring, sunlit waters. (See full page photograph.) Heaven, surely, was close at hand in the Grand Canyon of the Yellowstone!

Animals.

Yellowstone Park is one of the world's largest wild-animal refuges in the world. Among the inhabitants of this immense wilderness (3,348 square miles) are deer, bear, elk, antelope, mountain sheep, moose, and bison.

The largest herd of buffalo is the Lamar River herd in which there were 925 at the last count, including 105 calves of the 1927 crop. The so-called "wild herd" that ranges on the headwaters of the Lamar is estimated to total 125. The Lamar River herd is sometimes fed by rangers who put out hay for them in the winter. The other herd stays in the highlands and shifts for itself, hence it is called the "wild herd."

The latest census of Yellowstone Elk herds was submitted on March 2, 1927. The total number of elk in the park at that time was 17,347, not including the Gallatin herd. Along the Lamar and Yellowstone Rivers on the northern boundary there are over 3,000 elk besides the Gallatin herd which has about 3,000 There is a moderate increase in the size of the elk herd every year. Invoices or census is taken by the state game commission and federal ranger service cooperating.

Fish and Fishing.

The waters of the park abound in fish, mainly trout and grayling. Trout often attain large size especially in Yellowstone Lake where they may be taken freely from boats. The day's limit per person is 10 fish.

Number of Visitors.

During the 1927 season 200,285 people visited the park; the estimate for 1928 beginning of the season was 210 000; and within five years, or in 1932, it is estimated that approximately 400,000 people will enter the gates of the park during the summer season.

YELLOWSTONE PARK

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Yellowstone National Park. Northern Pacific Railway publication.

Glimpses of Our National Parks. Contains descriptions of the most important features of the principal national parks.

Automobile Road Map of Yellowstone National Park. Contains automobile regulations, shows park road system, hotels, camps, free public auto camp grounds, garages, superintendent's office, etc., etc.

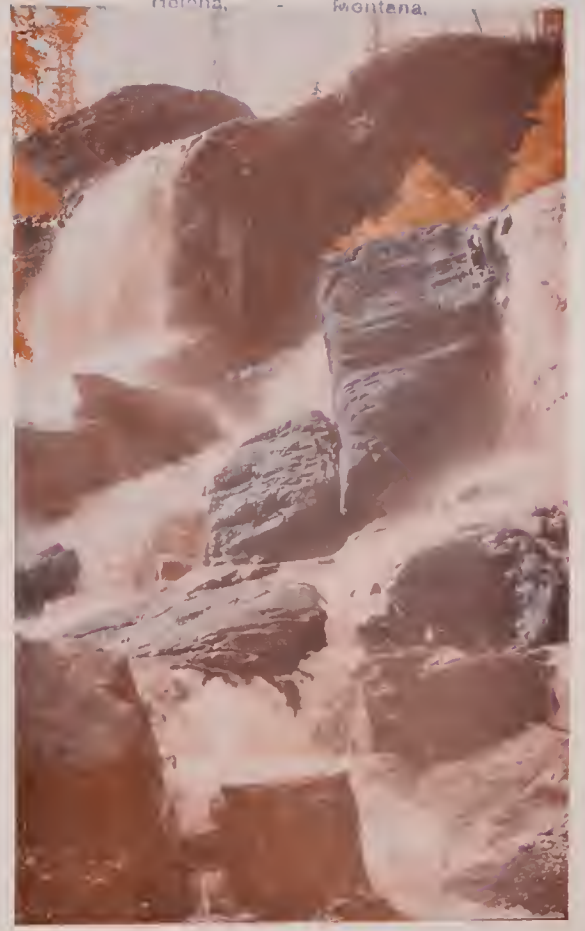
Map of National Parks and Monuments. Shows location of all the national parks and monuments administered by the National Park Service and all railroad routes to the reservations.

Mount St. Charles College
LIBRARY
Helena, - Montana.

DESIGN OF STATE FLAG

The "State Flag of Montana" shall be a flag having a blue field, with a representation of the great seal of the state in the center, and with a golden fringe along the upper and lower borders of the flag; the same being the flag borne by the First Montana Infantry, U. S. V., in the Spanish-American war, with the exception of the device, "1st Montana Infantry, U. S. V."—(Legislative enactment.)

A typical farm scene with a background of snow-covered mountains in one of Montana's sheltered valleys.



Cascades in the Swan River Country, near Missoula.

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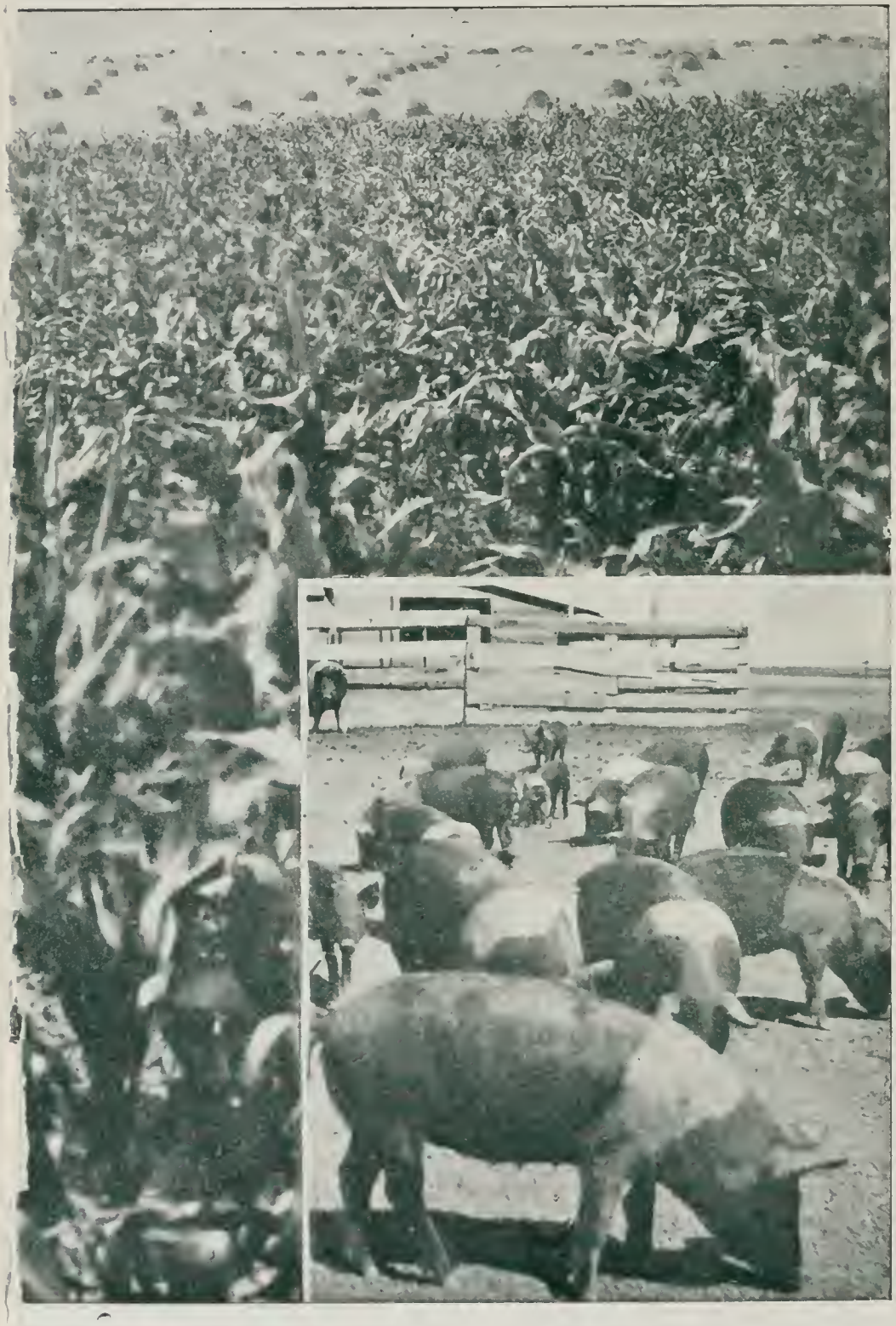
Census material indicates increasing diversity on Montana farms. In 1920 only 2.5 per cent of farms grew corn; in 1928 more than 10 per cent were growing it. Forty-five per cent of farms reported swine in 1920; almost 60 per cent have swine in 1928. Small farm flocks of sheep are rapidly becoming the rule in some sections. Farming is no longer an experiment in Montana. The photographs show: Corn in Cascade county. (Left inset.) Sheep in Blaine county. (Right inset). Roosevelt county hogs.



than 10 per cent were growing it. Forty-five per cent of farms
sections. Farming is no longer an experiment in Montana. The

GLACIER NATIONAL PARK

Glaciers, Water Falls, High and Vertical Cliffs, Lakes, Vegetation, Wild Animals the Attractions.

"Like the great state wherein it lies, Glacier Park is, indeed, a treasure land, but possessed of treasures greater than those tangible or of monetary value. Rather, are they the priceless, inexplicable treasures found only where the Great West begins," wrote Barbara Ann Scharr in the 1926 "Montana."

"Here in a wilderness of massive, snow-clad mountains on whose rugged slopes recline the vast, deep stretches of ice and snow, which have given the park its name—seemingly bound'ess glaciers—here where lakes lie in cool, glassy quietude reflecting with the clarity of mirrors the blue of skies, the green of woodlands and the height of mountains, here where days dawn in go'd and drift on through long, happy hours, free from cares, to sink in rose and purple sunsets; here where people from all walks of the universe meet either in the spacious, rustic hotels and chalets or out on the far, high places of hidden mountain trails; here may be found the greatest treasures of life—freedom, wholesome atmospheres, even thinking, and a beauty of such magnitude that it lingers ever in the memories of those who witness it.

"WHERE DAYS DAWN IN GOLD TO SINK IN ROSE AND PURPLE SUNSETS"

"Lakes and mountains, skies of blue,
Birds that sing all day to you,
Hills to climb, vales to descend,
Breezes that enchantment lend,
Trails that lead you know not where—
And somehow you do not care—
Swishing woodland, mountain streams,
Hours to fill with naught but dreams,
Space that opens new desires,
Kind'ing dead ambition's fires;

Oh, what wonderland awaits
Him who knocks at Glacier's gates!"

Administration of the Park.

The park is under the direct supervision of the superintendent who represents the United States Department of the Interior, National Park Service. A corps of efficient rangers is stationed at the different points of interest to protect the park and direct and help tourists.

Headquarters are at Belton, near the western entrance. Public utility companies operating under Government supervision have offices at both the east and west entrances.

Travel to Glacier Park increases yearly. Proclaimed a national park in 1910, one of the newest of our national playgrounds, last year 41,745 people and 7,980 cars entered its gates during the regular season. With the completion of the new road program eliminating the necessity of shipping cars over the divide, the number of tourists will more than double.

"WONDERFUL SHINING MOUNTAINS, NEVER TWICE ALIKE"

Attractions of Glacier Park.

The attractions of Glacier Park as listed in Dr. M. J. Elrod's guide to the park are:

1. The glaciers from which the park derives its name. Sexton, Sperry, Grinnell, and Blackfeet are easily accessible. There are over 60 glaciers.

2. The waterfalls. These are numerous, distributed throughout all sections of the park and often quite readily accessible.

3. High and vertical cliffs. The mountain formation has made the cliffs which may be as high as four thousand feet.

4. The lakes. Mountain lakes of varying colors, nearly 250 in number, greet the eye of every visitor. Motor boats are on four of the lakes, McDonald, upper St. Mary, middle Two Medicine and Waterton.

5. Color. The mountain masses are of red, green, yellow and gray, the tints depending on the sunshine, clouds, vegetation and moisture. Abrupt changes from one to the other are not uncommon.

6. Vegetation. There are large blocks of virgin timber, untouched, appearing in the distance as smooth as a floor. Beds of beautifully colored flowers, miles in extent, are a joy to all trail riders and hikers. Such extensive natural gardens as grow in Glacier park must be seen to be appreciated.

7. Wild animals. The vanishing big game animals may be seen by all with a little care and effort. Some are to be observed by every person who passes along the trails.

8. The wonderful, shining mountains. They are always in view. They are never twice alike. They always exert a reverential influence. They call. They pull. They grow in influence and power.

Roads and Trails.

Glacier Park has about 100 miles of roadways. A complete program of road construction and improvement has been outlined in the past two years and when it is completed, the entire road system of the park will be surfaced and of government high standard.

The most notable piece of road construction now under way is the building of the Transmountain highway from Lake McDonald up over the divide of the main range of the Rockies and down to Lake St. Mary on the east side. When this new highway is completed, it will open to auto tourists the scenic interior of the Park which formerly was not accessible except by foot paths and narrow trails used for pack trains and saddle parties. Transmountain Highway will be completed to the top of the Continental Divide, terminating at Logan Pass during the fall of 1928.

Glacier is essentially a park of trails. The trail system is as complete as has been possible to make it in the time since the park has been opened and is constantly being improved. During the 1928 season a comprehensive trail construction and reconstruction program was undertaken with an initial appropriation of $46,000 for equipment, materials and necessary engineering and labor. The program will be continued each year until all major trails are built to highest standards.

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GOVERNMENT PUBLICATIONS

Government publications on Glacier National Park may be obtained as indicated below. Separate communications should be addressed to the officers mentioned.

Distributed free by the National Park Service

The following publications may be obtained free on written application by the Director of the National Park Service, Washington, D. C., or by personal application at the registration offices of the park at Glacier Park Hotel (eastern entrance) and at the superintendent's office at Belton (western entrance):

Glimpses of Our National Parks, 48 pages. Glacier National Park on pp. 34-37.

Automobile Road Map of Glacier National Park. Shows the park road system, hotels, chalets, garages, superintendent's office, routes to the park, etc.

Map of National Parks and National Monuments. Shows location of all the national parks and monuments administered by the National Park Service, and all railroad routes to these reservations.

HINTS TO HIKERS

The following publications may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at the prices given. Remittances should be made by money order or in cash. No additional charge for postage:

Alden, W. C. **Glaciers of Glacier National Park.** 48 pages, including 30 illustrations. 15 cents.
Bailey, Vernon. **Wild Animals of Glacier National Park: The Mammals; The Birds,** by Florence Merriam Bailey; 210 pages, 94 text figures, 37 plates, including map, 50 cents.
Campbell, M. R. **Origin of the Scenic Features of Glacier National Park.** 42 pages, including 25 illustrations, 15 cents.
Campbell, M. R. **Glacier National Park—a** popular guide to its geology and scenery. (Bulletin 600, U. S. Geological Survey), 54 pages, 13 plates, including map, 30 cents.
Elrod, M. J. **Some Lakes of Glacier National Park.** 32 pages, including 19 illustrations, 10 cents.
Standley, Paul C. **Botany of Glacier National Park.** 1921. Cont. U. S. Nat. Herb., Vol. 22, Pt. 5, 50 cents.
Standley, Paul C. **Plants of Glacier National Park.** 110 pp., illustrated, 50 cents.
Yard, Robert Sterling. **National Parks Portfolio.** 260 pages, including 270 illustrations. Pamphlet edition, loose in flexible cover, 35 cents; book edition, containing same material securely bound in cloth, 55 cents.

THE PEOPLE AND INSTITUTIONS

Montana's greatest asset is the character of her citizenship. The beginnings in the State were made by the sturdiest race which has yet been known—the American pioneer.

It was the lure of gold that brought these pioneers in the late '50s and early '60s across the plains and over the mountains to Montana. Those in search of the yellow metal populated Alder gulch and Bannack and other camps. Yet is was not gold and silver alone that lay behind the early day development. There were other things of equal importance. There was national unrest following the Civil war. There was the thrill of a new country, and new money to be made from it. It was not altogether a matter of riches. Those were the days of "the poor man's chance," when land was free. Any man with strength and courage could be his own master. As a result those who first came to Montana were the men and women willing to face unknown dangers. The weak and timid were left behind. The strong and fit went forth to blaze the trail.

These men and women builded in Montana a picturesque civilization. It has passed. The new has taken its place. Montana is no longer of the "wild and woolly" west. The cowboy has gone. The bloodthirsty Indian is found only at county fairs and then on the payroll of the local Chamber of Commerce.

Montana is today a land of splendid schools and churches, of strong financial and benevolent institutions, peopled by a progressive citizenship. The new citizen will, in coming to Montana, find that he need not leave the corner drug store, the moving picture theatre or even the push button. Illustrations of modern farm life are to be found on every hand, even in the newest communities. The well furnished home, the opportunities for social intercourse are everywhere.

These free men and women of Montana, who laid the foundations of this commonwealth, brought arid lands under the plow, built the highways, constructed irrigation ditches and made the land bloom—who carried the banner of civilization across the continent—will be found by the newcomer a kindly, generous and progressive people with their eyes still on the future. They are good neighbors and good friends and the purpose of the next few pages of this book is to outline a few of the characteristics of Montana citizenship and to present a few of our institutions; manifestly it is impossible to mention all of the institutions of a great state.

PEOPLE AND INSTITUTIONS

Population January 1, 1928, Only 546,708—Agricultural Legislation—Old Age Pensions and Social Legislation.

The population of Montana on January 1, 1928, shows an increase of about 1,500 over 1927 and an increase of about 25,000 in the last two or three years. On January 1, 1928, there were 546,078 persons in the state, according to an estimate prepared by the division of publicity, cooperating with the bureau of vital statistics. Fifty-five years ago the population was 20,595. The following table indicates Montana's growth:

Census Year	Population	Increase Over Preceding Period		Per cent of increase in the U. S.
		Number	Per Cent	
1928	546,078	170,025	45.2	18.0
1910	376,053	132,724	54.5	21.0
1900	243,329	100,405	70.3	20.7
1890	142,924	103,765	265.0	25.5
1880	39,159	18,564	90.1	30.1
1870	20,595	.....	...	...

In 1928 sixteen counties in the state show an increase in population as compared with 1920. These counties are: Big Horn, Cascade, Deer Lodge, Gallatin, Glacier, Lincoln, Pondera, Prairie, Richland, Roosevelt, Sanders, Silver Bow, Teton, Toole, Valley and Yellowstone.

The largest increase is in Yellowstone county where a population of 35,259 is reported for 1928 against 29,600 in 1920, an increase of 5,659. Silver Bow shows an increase of 4,495 persons over the 1920 figure, going from 60,313 in 1920 to 64,868 in 1928. The next county is Deer Lodge with an increase of 4,319 over the 1920 count. Next is Big Horn with a 2,554 increase. Valley county went from 11,542 to 13,802, Gallatin from 15,864 to 17,849 and Toole from 3,724 to 4,908.

Several counties retained almost the same population over the seven year period. Fallon county varies by only 41, from 4,548 in 1920 to 4,507 in 1928, McCone only 61, from 4 747 to 4,686. McCone shows an increase of 186 over the 1927 estimate of 4,500. Other counties with very little change in population figures are: Teton 5,987 and 5,870; Lewis and Clark 18,528 and 18,384.

Counties showing the heaviest decrease in population are those from which new counties have been created.

Increases are due to such factors as oil drilling activities and railroad development. New farming lands opened both in the Redwater valley district and in the northeastern part of the state have brought a number of settlers into those regions.

The Largest County Populations.

The five counties now having the largest population are: Silver Bow, 64,808; Cascade 39,384; Yellowstone, 35,259; Deer Lodge, 19,642; Missoula, 18,919.

The Smallest County Populations.

Those having the fewest number of people are: Treasure 1,066; Liberty 1,571; Mineral 2,013; Petroleum, 2,176; and Meagher, 2,209.

According to the 1928 estimate there are 336,817 persons over 21 years of age in the state and 209,261 under 21 years. Children of both sexes below six years of age number 54 103; between six and 21 years, 155,262. There are 106,786 males below the legal age in the state and 102,475 females.

Population estimates as given in years between the regular federal census years are based on school census reports, vital statistics and registration at the general elections.

Population and Land Area by Counties

COUNTY	Land Area (sq. mi.)	Population 1920	Population 1928	COUNTY	Land Area (sq. mi.)	Population 1920	Population 1928
Beaverhead	5619	7,246	5,061	McCone	2684	4,747	4,686
Big Horn	5116	7,015	9,569	Meagher	1221	2,622	2,209
Blaine	4271	9,057	6,960	Mineral	2412	2,327	2,013
Broadwater	1250	3,239	2,637	Missoula	2649	24,041	18,919
Carbon	2069	15,279	14,032	Musselshell	1900	11,938	7,286
Carter	2722	3,927	3,432	Park	2675	11,345	11,002
Cascade	3319	38,836	39,384	*Petroleum	1686		2,176
Chouteau	3942	11,051	7,348	Phillips	5279	9,311	7,476
Custer	3788	12,194	11,224	Pondera	1634	5,741	6,108
*Daniels	1440		6,506	Powder River	3276	3,357	3,058
Dawson	2383	9,239	8,895	Powell	2350	6,909	5,734
Deer Lodge	730	15,323	19,642	Prairie	1737	3,684	4,045
Fallon	1673	4,548	4,507	Ravalli	2396	10,098	9,061
Fergus	4312	38,344	17,975	Richland	2102	8,989	9,674
Flathead	5294	21,705	18,533	Roosevelt	2383	10,347	11,513
Gallatin	2532	15,864	17,849	Rosebud	5067	8,002	7,276
Garfield	4858	5,368	4,368	Sanders	2840	3,949	4,731
Glacier	3045	4,178	5,843	Sheridan	1720	13,847	10,418
*Golden Valley	1173		2,665	Silver Bow	719	60,313	64,808
Granite	1733	4,167	3,278	Stillwater	1773	7,630	6,761
Hill	2907	13,958	12,677	Sweet Grass	1855	4,926	4,176
Jefferson	1637	5,203	4,569	Teton	2295	5,870	5,978
*Judith Basin	1869		4,342	Toole	1945	3,724	4,908
*Lake	1654		9,810	Treasure	998	1,990	1,066
Lewis & Clark	3478	18,528	18,384	Valley	5064	11,542	13,802
Liberty	1440	2,416	1,571	Wheatland	1419	5,619	4,184
Lincoln	3666	7,797	8,263	Wibaux	886	3,113	2,339
Madison	3590	7,485	6,058	Yellowstone	2690	29,600	35,259

*Created since 1920.

The United States census estimates that 97.3 per cent of the population is white. Indians number two per cent, the remainder being divided between negroes and orientals.

The total land area of the state is 146,131 miles. The average number of inhabitants to the square mile at the end of 1927 is estimated to be 3.9, as against 2.6 in 1910 and 1.7 in 1900. Montana thus contains about one-twentieth of the land area of the United States and about .5 per cent of the population. Were Montana as densely settled as the average of sister states we would today have a population of about 5,500,000. In common with many of the western states there are more males than females in Montana, the last government figures giving for males 299,941 and females 248,948.

A Land of Home Owners.

Montana is a land of home owners. The latest available figures show a total of 139,912 homes in the State. Of these, 81,840 are owned by the occupants and 53,362 are rented. In percentage of home ownership Montana ranks with the first three states.

Illiteracy Low.

The percentage of illiteracy in Montana is estimated at 2.3. There is a dispute as to the exact rating of the state in relation to the other commonwealths, but it is safe to say that in the percentage of illiterates Montana ranks with the two or three foremost states. Illiteracy of native whites is only .3 of one per cent.

Montana a "Doubtful" State.

Politically Montana stands with those states classified as "doubtful" at election time. The state is thus protected against the abuses of unbridled political power. In the first national election following statehood, Montana's electorial vote was cast for Benjamin Harrison; in 1896 and 1900 for William J. Bryan; in 1904 for Theodore Roosevelt; in 1908 for William H. Taft; in 1912 and 1916 for Woodrow Wilson; in 1920 for Warren G. Harding, and in 1924 for Calvin Coolidge. The present governor of Montana is a Democrat, a majority of the other state officials are Republicans.

Past Presidential Vote of Montana.

1892 (Pres.), Cleveland, Dem., 17,581; Harrison, Rep., 18,851; Weaver, People's 7,334; Bidwell, Proh., 549.

1896 (Pres.), Bryan, Dem. and People's (Populist), 42,537; McKinley, Rep., 10,494; Levering, Proh., 186.

1900 (Pres.), Bryan, Dem., 37,145; McKinley, Rep., 25,373; Woolley, Proh., 298; Debs., Soc., 708.

1904 (Pres.), Parker, Dem., 21,773; Roosevelt, Rep., 34,932; Swallow, Proh., 335; Debs, Soc., 5,676.

1908 (Pres.), Bryan, Dem., 29,326; Taft, Rep., 32,333; Chafin, Proh., 827; Debs, Soc., 5,855.

1912 (Pres.), Wilson, Dem., 27,941; Taft, Rep., 18512; Roosevelt, Prog., 22,456; Debs. Soc., 10,885.

1916 (Pres.), Wilson, Dem., 101,063; Hughes, Rep., 66,750; Roosevelt, Prog., 298; Benson, Soc., 9,564.

1920 (Pres.), Cox, Dem., 57,372; Harding, Rep., 109,430; Christensen, F.-Lab., 12,204.

1924 (Pres.), Coolidge, Rep., 74,138; Davis, Dem., 33,805; LaFollette, Ind., 61,105.

Agricultural Legislation.

Much of the energy of the State is being spent in the development of the agricultural interests. Intelligent legislation has been passed for the benefit of the farmer. This legislation in part is administered by the Commissioner of the Department of Agriculture, Labor and Industry, providing for the proper grading of grain, the strict inspection of grain elevators and the furnishing of trained state agents to assist the farmer in the various branches of the industry.

Another stimulus to better farming is given by numerous state and county fairs held each year.

County Agents.

Of incalculable assistance in building the agricultural industry on a foundation of stability are the county agents. In the story of the counties found in another part of this book, all counties having agents are listed and prospective settlers are urged to see these men and talk with them before beginning a farming program in Montana.

"With 40 extension agents in 32 counties of the state, Montana's Extension Service has reached a new high point in growth and development," says J. C. Taylor, director of extension at Montana State College.

The 32 of the 56 counties with extension agents have 34,505 farms out of a total of approximately 49,000 farms in the state. Thus, about 75 per cent of the farms of Montana now have the service of extension agents.

In the little more than a decade of extension work in Montana the agriculture of the state has made steady progress and sound growth, Mr. Taylor states. Out of the vast amount of information obtained in the beginning ten-year period have come certain basic principles which today are the foundation of extension work in the state. In agricultural economic conferences held last year and this year, these principles have been used as the starting point for agricultural development programs for the various districts, irrigation projects and counties of the state and these programs now serve as a guide for extension work, says Director Taylor.

Smith-Hughes Agricultural Schools.

The opening of the 1927 public school year in Montana found 25 high schools with Smith-Hughes agricultural departments, according to an announcement by M. J. Abbey, in charge of Smith-Hughes work for the state. Of the 25 instructors who will head these departments, 19 are graduates of Montana State College.

"Smith-Hughes work is supported in part by federal funds and before departments can be established schools must comply with the regulations and requirements of the federal law under which the work is conducted. Many Montana high schools have applied for agricultural departments but the number is limited to the amount of federal money available," Mr. Abbey explains.

The present number of Smith-Hughes departments in high schools of the state has been reached since 1918 when the work was first organized. Last year there were 24 such departments in the state and 530 farm boys successfully completed the year's work including the practical farm projects required of all Smith-Hughes students during the summer vacation.

Cooperative Marketing.

Montana's 34 cooperative marketing associations with more than 5,000 members did a business amounting to approximately two million dollars last year, according to a summary of farmers' cooperative marketing activities in the state by Fred Bennion, county agent leader.

The total sales of the cooperative marketing agencies amounted to more than one and three-quarter millions of dollars and cooperative purchases of seeds, sacks, poisons, explosives, fertilizers, crates, and other supplies reached another quarter of a million.

Sales of livestock through livestock shipping associations totalled $746,282. These associations were in operation in 11 counties with Prairie County leading with sales amounting to $204,693. Sales in Blaine, Hill and Teton Counties each amounted to $100,000 or more. Stillwater County was the leader in cooperative wool shipments doing a business of $284,000. Judith Basin, Gallatin, Hill and Sanders Counties also operated wool pools bringing the total of wool sales to $378,542.

Poultry and poultry products sold through 11 cooperative associations totalled $185,065. This figure is not complete for the year 1926 since the figures were compiled December 1 and many of the turkey shipments were not made until just before the Christmas season. Pondera County sold $87,000 worth of poultry and poultry products through its marketing association. Stillwater, Judith Basin, Blaine and Hill Counties each marketed more than $15,000 worth of these products. Other counties operating poultry marketing pools were Prairie, Flathead, Yellowstone, Cascade, Chouteau and Gallatin.

Alfalfa seed sales through cooperative agencies amounted to $148 060; grain, $205,000; butter fat, $68,878; seed potatoes, $45,300, and other products $19,352. It is estimated that farmers saved $175,000 through the operation of their marketing associations.

State Hail Insurance.

The State Board of Hail Insurance has been in operation since 1917 and during that time over 18,900 farmers have carried hail insurance amounting to approximately $24,000,000 with about 5,200 claims having been adjusted and paid in the eleven-year period.

Losses under state hail insurance are adjusted and paid on much the same basis as under stock companies, the main differences being that state insurance covers damage for the entire growing season, regardless of the age of the grain, providing insurance for a longer period than is usual with the stock companies, and allows damages for plants measuring less than ten inches, where damage proves to be more than a setback, while stock companies exempt payment on losses on wheat and oats until three-fourths of the plants measure ten inches long.

The support given the state board by Montana farmers, has shown a general and steady increase since 1923. In 1927 the total amount of risk written amounted to over $1,800,000 with a premium charge of about $150 000. In that year 1,800 farmers took advantage of hail insurance offered by the state, insuring 218,000 acres of crops or about 121 acres each at an average risk of $8.25 per acre. Four hundred and eighty-two loss claims were filed in 1927 and damages paid amounted to approximately $120,000.

Crops that may be insured include wheat, oats, flax, barley, rye, corn, buckwheat, speltz, timothy, clover and alfalfa seed, peas, beans and hay crops. Wheat is the main crop insured, averaging about 90 per cent of all crops, and of this large percentage, from 80 to 90 per cent is spring wheat alone. The amount of insurance carried annually by each farmer has been about $1,300, the average loss paid each claimant approximately $250. For 1927 the average insurance carried per farmer was $1,000, and loss payments averaged about $250.

Old Age Pension.

Montana was the second state in the Union to enact an old age pension law. and the first to put it into successful operation.

Eight Hour Law For Women.

Our laws for the protection of women wage workers, while not perfect, are better than similar laws in some of the other states. Under these laws no woman may legally be employed more than eight hours out of any twenty-four hours. The law requires that working women be provided with seats and other comforts totally lacking in most of the states.

Child Labor.

Children under the age of sixteen are prohibited from all hazardous, unhealthy and immoral occupations. According to the United States census there are about 60,000 children in the State between ten and fifteen years of age. Of these about 1400 are gainfully employed, the per cent of children so employed being 2.3, ranking the State first among all states in percentage of children not employed.

Election Laws.

Primary election laws insure every qualified voter the right to take part in naming candidates from Governor to Constable.

Initiative and Referendum.

Through the initiative and referendum the people may, reasonable provisions for ascertaining public sentiment having been complied with, override the wishes of elected officials and enact measures of their own making.

Compensation.

Workmen's Compensation laws, eliminating several features embodied in the principles of defense formerly used in suits for damages resulting in injury or death of employees, have been enacted, and, while not satisfactory to the workers, mark a long step forward. The most important features of this law follow: A maximum total payment for temporary total disability of fifteen dollars per week for a period of three hundred weeks; a maximum payment for permanent total disability of fifteen dollars for a period of five hundred weeks; compensation for injury causing death is paid to certain dependents, depending upon the relationship on a scale graduated down from fifty per cent of wages received by the deceased, to thirty per cent of such wages; but in all cases the payments are limited to a maximum of fifteen dollars per week and to four hundred weeks.

The age limit of minors who may receive benefits as dependents was raised by the last Legislature from sixteen years to eighteen years. Specific minor injuries are paid for periods ranging from two hundred weeks for the loss of arm, at or near the shoulder, to three weeks for loss of fourth finger at distal joint, all at a rate not exceeding fifteen dollars per week. Minimum compensation was increased by the last Legislature, and is now seven dollars per week in all cases. Medical and hospital services furnished are very liberal, the law providing that during the first six months after the happening of the injury the employer or insurer or the Industrial Accident Board, as the case may be, shall furnish reasonable medical, surgical, and hospital service and medicines needed, not exceeding in amount the sum of five hundred dollars. The law makes it elective to those engaged in agricultural, stock-raising and allied industries, to accept the provisions set forth in plans two and three, and upon complying with the statute are exempted from damages, under the common law or by statute.

Organized Labor.

Since 1895 when the state's Trade and Labor council of Montana was organized, labor has been officially recognized. In January, 1908, a charter was granted by the American Federation of Labor to the Montana State Federation of Labor. The State Federation of Labor has some 150 unions affiliated representing, it is said, between fifteen and twenty thousand organized working men. The Federation is always watchful of the interest of the workers at the state legislature and endorses or protests in the name of labor when measures affecting them are introduced.

People Patriotic.

The people of Montana are patriotic. During the World War 35,000 entered the army or navy. In the Liberty Loan and other campaigns Montana made an admirable record.

Progressive.

The people of Montana are progressive. For example, according to the United States Census Bureau in 1922 there were a total of 55,115 telephones in the state; one for every ten inhabitants.

The Size of Montana.

Montana is a land of variety. Few thinges are omitted. The soil, the water the air, the forests, the people and their institutions, furnish a variety that lends spice to life and enjoyment in Montana. There are 170.4 acres in Montana for each inhabitant. The District of Columbia has but one-tenth acre, Rhode Island but one acre, and Washington, to the west, but 31 acres to each inhabitant.

THE UNIVERSITY OF MONTANA

One Hundred Buildings Used by Various Units — 4,818 Students Registered at All Branches of University.

The constitution of the State of Montana specifies that the general control and supervision of the University of Montana shall be exercised by the State Board of Education. The University of Montana comprises twenty-five teaching and research units. There are twelve schools and colleges in the State University at Missoula, four colleges and three schools at the State College at Bozeman, the School of Mines and a Bureau of Mines at the State School of Mines, Butte, and a Normal College with a teachers' Service Division directed by the State Normal College at Dillon, and the Eastern Montana Normal School at Billings. In addition to these teaching and research units the State College at Bozeman directs the work of the Agricultural Experiment Station and the Agricultural Extension Division.

The State Board of Education is charged with the appointment of the administrative, educational and clerical officers of the various units of the University of Montana. This staff is composed of 448 persons. The Chancellor, whose office is in the State Capitol at Helena, is the chief executive officer of the University of Montana.

The various units of the University operating under the control of the State Board of Education own 3,817 acres of land. One hundred buildings are used by the various units of the Greater University. The value of the land, buildings and equipment is over $7,000,000.

During the last year 4,818 students were registered in the five teaching units of the University of Montana. Over 120,000 people in the state were served by the various Extension and Experiment Station organizations during the year 1927-1928.

PUBLIC SCHOOLS

Montana Employs About 6000 Teachers—Sources of School Revenue and Qualifications of Teachers Outlined.

By Mina Petrashek

School districts have been organized and schools are maintained wherever land is surveyed and settled. Except in extremely sparsely settled sections there is a school within reasonable distance of every child. According to the latest biennial survey, there were in Montana 2479 one-room schools, 121 two-room schools, 150 village schools, and 167 schools in towns and cities; 191 cities, towns, and larger villages are provided with either district or county high schools. Attendance at these high schools is free to any child residing within the county in which the high school is located.

Montana derives her school revenues from several sources. The income derived from investments of the permanent school fund and from leases of school lands constitutes an annual revenue to school districts of about $7.70 per census child.

In each county a uniform levy of six mills on all taxable property furnishes a fund which is distributed to all districts on the census basis. The amount derived from this source is much greater than that derived from state sources, in some counties amounting to $40 per census child. There is also a uniform county levy for high schools distributed to high schools of the county on the basis of attendance and number of teachers employed.

By far the greatest portion of funds necessary to maintain a school is derived from a special levy on the property of the school district. Funds for building purposes are raised entirely by the district.

The majority of schools in Montana maintain terms nine months in length. No district may have its high school accredited unless its term is at least 170 days of actual teaching.

Districts with extremely low taxable valuations because of tax exempt lands, and for that reason having difficulty in raising funds for a nine-months' term, may secure aid from the common school equalization fund. This fund is apportioned annually by the State Board of Education to needy districts that meet certain specified requirements as to tax levy for school maintenance and length of term. With the help of this fund, short-term schools are rapidly acquiring long terms.

In architectural design school buildings in Montana compare favorably with those of any other state. The State Board of Health and Superintendent of Public Instruction must grant approval of building plans before a building may be constructed. Many rural districts have built and equipped cottages for the use of teachers; some village schools and several county high schools have dormitories where children from a distance are taken care of during the week; practically all high schools have gymnasiums which provide an opportunity for physical development.

It is generally conceded that as is the teacher so is the school. Montana's certification requirements insure considerable preparation for the work of teaching. No one can secure a certificate to teach in Montana without 24 quarter hours of professional training in addition to a four-year high school course. After September 1, 1929, the minimum will include 48 quarter hours of professional work. These requirements, with the passing of examinations, qualify teachers for rural and small village positions. Teachers in larger places are generally required to be graduates of standard normal colleges if they teach in elementary schools, or of accredited universities if in high schools. Montana employs about 6,000 teachers and the average length of service is about four years.

Eighteen high schools maintain normal training departments whose graduates receive two-year teachers' certificates valid in rural schools.

The State Normal College, located at Dillon, and the Eastern Montana Normal School, located at Billings, regularly maintain summer schools for teachers, and in addition supervise regional summer schools in Havre and Miles City, respectively. Credits earned in these schools are recognized as college work and can be applied toward teachers' certificates in lieu of examinations.

Every elementary or rural teacher in the State is supplied with a course of study published by the Department of Public Instruction. The excellence of this course has been favorably commented upon by leading educators in many other states. In addition to guidance furnished by this course, teachers have opportunities to assemble for observation and discussion of best teaching practices under the direction of county superintendents and state school supervisors. Larger schools, as in most states, employ supervising principals.

A rural school which meets certain high standards of excellence as to qualifications of the teacher, type of school building, and completeness of equipment is rated as a "Standard School." One meeting a still higher standard or nearing perfection is rated as a "Superior School." Schools receiving either rating are awarded appropriate distinguishing plates. Schools bearing standard or superior school plates are found in every county of the State.

High schools in Montana are all accredited on the basis of standards adopted by the State Board of Education. Many of the larger high schools are members of the Northwest and North Central accrediting associations, and their graduates are admitted to all colleges and universities which do not require entrance examinations of all applicants for admission.

WOMEN'S CLUBS

One Hundred Forty-Two Clubs Affiliated With State Federation Having Membership of About Six Thousand.

One of the outstanding women's organizations is the Montana Federation of Women's Clubs, affiliated with and operating in conformity with the rules and regulations of the national organization having clubs in every state in the Union.

The work of the club is non-sectarian and non-political, its object being to bring into relations of mutual helpfulness the various clubs throughout the state, organized for literary, civic, philanthropic, artistic, scientific or other educational purposes.

There are 142 clubs in the state, with nearly 6,000 members. The work in Montana is divided into nine sections with various subdivisions as follows: Department of American Citizenship: subdivisions, Americanization, Indian Work, Citizenship Training and Law Enforcement, Cooperation with Veterans; Department of American Home: subdivisions, Montana Products, Home Extension Service, Home-making, Home Economics Teaching, Family Finance, Insurance; Department of Education: subdivisions, General Education, Illiteracy, Visual Education, Community Service, Conservation of Natural Resources; Department of Fine Arts: subdivisions, Music, Art, Literature and Library Extension, Art in the Home and Garden, Restriction of Out-Door Advertising; Department of International Relations: Department of Legislation: Department of Montana History: Department of Public Welfare, subdivisions, Child Welfare, Health, Institutional Relations; Department of Press and Publicity.

The state is divided into seven districts. Each club meets once a month, the state convention is held biennially and the district conventions are also biennial, being held in the year between the state conventions.

Montana is represented each year at the national convention and is also honored by having members elected to serve on the national board.

A Unique Club.

In the eastern part of the state, the Garfield County Homemakers' Club has the distinction of being, it is believed, the only woman's club in the United States with an enrollment of 200 members which is located 50 miles via auto trail from the nearest railroad.

The club has been in existence for 13 years and was originally organized as a purely social affair at a time when neighbors were few and far apart and the women on homesteads were lonely. The club started with about a dozen members. Some of the women walked to meetings with a baby on one arm and a bucket of lunch on the other. Some rode horseback or came in wagons.

ART IN MONTANA

"The great heavens
Seem to stoop down upon the scene in love—
A nearer vault, and a tenderer blue,
Than that which bends above our Eastern hills."
—Bryant.

By Dan R. Conway

When the annals of American art are conscientiously and honestly treated, Montana will stand high upon the role of fame, and there will be recorded on the historical pages the names of Edgar S. Paxson, Charles M. Russell and Ralph E. DeCamp as a group of Montana painters who have not only done good work technically, but who have immortalized on canvas the Indian, the pioneer, the trapper, the ranchman, the cowboy, together with the fauna, the flora and the landscape peculiar alone to this section of the country.

These three painters have had their homes in Montana, and they have proved themselves as much imbued with Montana's atmospheric conditions and its topology as the famed group of Frenchmen with that of the neighborhood of Fontainbleau, in which they lived and worked, and from which they obtained the designation of "Barbizon Painters."

Many American artists, particularly since the railroads have made it possible for them to travel with speed and comfort, have come West for the purpose of sketching, these sketches becoming finished canvasses hundreds of miles from the places of their original inspiration. But this particular group of Montana artists is of the country itself, a part of its life, of its evolution, and has, to all intents and purposes, created an atmosphere peculiarly its own. The doyen of this group, although each individual has worked individually, was Charles M. Russell, whose splendid delineations of western life and characters, as well as historical themes in connection with life on the plains and in the mountains of the West, have earned for him international recognition as the greatest painter of western history the world has ever known.

The career of Charles M. Russell, were it written in the form of a romance of this Northwestern country, would be taken for fiction and imaginative conception upon the part of the author, rather than for actual fact. Born at St. Louis, Mo., March 19, 1864, this artist was, without doubt, a born genius; for, from earliest childhood days, even before he had learned the alphabet, he showed marked talent for modeling from wax and clay the forms of animals, birds and Indians.

A descendent of a noted family of frontiersmen, among the more important members of which was the famous William Bent, Russell as a boy was possessed with the spirit of adventure. He longed to come out into the Western country about which he had dreamed so much. When he was fifteen years of age, his father reluctantly consented to leaving him in charge of a friend who owned a sheep ranch in Judith river valley, Montana.

Life as a herder of bucks and ewes did not suit his adventurous fancy, and early in the summer of 1880, he was found at his campfire without money or food, by Jake Hoover. an old trapper. This plainsman took a fancy to the "kid", as he called young Russell, and the two lived together in Hoover's mountain cabin for several months.

This was a splendid experience for the restless, adventurous youth. He became familiar with the life of the hunter, trapper and prospector, with the equipment of the frontiersmen and the customs of the so-called rough frontier char-

acters. It was here that he saw the wonderful Montana sunrises, sunsets and landscapes which his retentive mind preserved accurately to be in later years reproduced upon canvas and paper. Shortly he entered the life which became inseparably associated with his works and his fame. In the open range country of central Montana, he became a nightherder of beef and horses—a typical cowboy.

During the terrific winter of 1886-87, he was in the employ of Stadler & Kaufman at what was known as the famous Bar R (—R) ranch in Judith Basin. In February of 1887, answering a request from his employers as to the condition of cattle on the range, he mailed back a little watercolor drawing which was destined to become a first stepping stone toward fame. This was a picture hastily drawn upon a small sheet of paper not larger than an ordinary envelope.

In the painting, a cow was pictured amid solemn and pitiless drifts of snow, perishing there from exposure to the fierce elements and from want of food. Near her were the prairie wolves, eagerly awaiting the first greedy onslaught, although hardly daring to attack the poor brute while a vestige of life remained. Beneath this sketch, the young cowboy placed the words that conveyed a gentle satire as well as conviction to the minds of his employers: "Waiting for a Chinook."

It was all-sufficient. The pathetic delineation of the scene, its suggestion of the brutal indifference of man to the care of animal creation, needed no written report. The sketch was accepted; it caught popular fancy and was ultimately given world-wide circulation through the efforts of the National Society for the Prevention of Cruelty to Animals, and then Charles M. Russell's name came to be associated with delineations of life on the faraway Western plains.

For eleven years, on the rolling prairie of Central and Northern Montana and in western Canada, he lived the life of a cowboy, dividing his time between herding cattle and living with tribes of the Blackfeet Indians. In 1893, he went to Great Falls, Montana, settling down to serious work in painting, not only as a pastime, but as a means for a livelihood. In 1895, he was married to Nancy Cooper, and in 1897, the young couple took up residence in Great Falls, where they lived until the time of the artist's death in 1926.

It was in April, 1911 that, with an exhibit entitled, "The West That Has Passed," at Folsom Galleries in New York City, Mr. Russell's became a fixed place far in the lead of his brand of creative art. And fame followed him through the capitals of Europe and America until his works at the time of his demise were commanding prices in excess of $10,000.

Mr. Russell worked in both oil and watercolor, and found true expression in clay and wax. In the use of watercolors his technique was reminiscent of the modern Dutch artists. It was solid and he forced it to express all the sentiment and poetry which is a particular charm of his pictures. In all his painting, he idealized the Indian more than most artists of the same subject. He was not a painter of stern realism, but rather a delineator of the poetical. His drawing was above reproach, and his foreshortening was superb. His work was free from the influence of "school," and untrammelled by tricks of the studio.

Of his historical creations, the most important adorns the wall back of the speaker's chair in the House of Representatives at the State Capitol in Helena. This is a massive mural in which the characters and animals are life-size. It portrays the meeting of the members of the Lewis and Clark expedition with the Shoshone Indians on August 22, 1805, at Two Forks, near Armstead, Beaverhead County, Montana. (See full page illustration in "Historical" section.)

Painting was likewise always Edgar S. Paxson's work. Born at Orchard Park, N. Y., in 1852, he learned to paint wagons which his father constructed. The spirit of adventure lured the lad West, and in 1877 he had found his way into the country of which Missoula is now the commercial center.

Being of a very gentle and kindly manner, Mr. Paxson made friends of all the Indians. Thus it became possible for him to get these redmen to pose for him; and he was therefore able to execute many notable portraits of the Indians. These were not the portraits of Indians of the reservation, bearing on their strong features the bitterness of subjection to the inevitable, but they were a type of the race, and as such proved valuable. His Indians were the Children of the Wilds, the believers in the mythical Great Spirit. He depicted them in action, too—not so much in the war dance—but rather pursuing their avocations in the matter of obtaining food by hunting, or pursuing their avocations within the environment

of the tepee. He also portrayed the "bad" Indian; and this fellow was a terror in appearance, as he showed his ability to the settlers and the troops.

Living so many years in the heart of the Rockies, Paxson could paint themes in connection with this region that today are truthful representations of atmospheric conditions, and in order to understand his paintings intelligently one must have seen that subtle sheen on the rocks, that mystical atmosphere of blue, deepening into shades of richest purple, yet vibrating with life, so characteristic of this country.

The State Capitol Building at Helena, bears several mural paintings created from the mind of Paxson and delineated by his able brush and hand.

Ralph E. DeCamp, of Helena, Montana, the sole survivor of this group, has achieved national fame through channels vastly different from Russell and Paxson, in that he has won fame as a painter of western landscapes in his native state.

His technique applied to the portrayal of landscapes, is individual and different from that of any of his contemporaries, with soft, pleasing tones and remarkably expert application of paint and natural colors. Whether it be the brilliant colorful Montana sunset reflected upon a mountain or a turbulent mountain stream, Mr. DeCamp invariably registers the scene just as Nature has given it to him in his visits to the wilds of his own country.

He, too, was employed by the state as one of the mural decorators for the State Capitol Building and some of his finest creations are there preserved. Mr. DeCamp is now creating some of his best works at his Helena studio.

To preserve the traditions in the fine arts as laid down and firmly established by this group of famous Montana painters, annual art exhibits have been instituted in the cities of Great Falls and Missoula, with the result that much new talent is being uncovered, and the state of Montana bears a promising future in art circles.

ART EXHIBIT 1928 AT GREAT FALLS

BANKS AND BANKING

During the Past Year Deposits in Montana Increased $20,000,000. Per Capita Deposits $313.56—Total Deposits Now $171,232,374.

All banks in Montana at the beginning of 1928 had total deposits of $171,232,374, an increase of about $20,000,000 over total deposits at the same date in 1927. At the beginning of 1927 there were $150,969,151 deposited in banks of the State. On the same date in 1915, before the war boom or the deflation period, total deposits were $114,135,768.

The number of banks on January 1, 1928, was 205 of which 132 were state banks, two were private and 71 national banks. The per capita deposits were $313.56, compared with $272.00 at the beginning of 1926 and $279.40 at the beginning of 1927.

Total deposits included $106,150,303 in demand deposits and $65,082,070 in time and savings deposits. Per capita demand deposits were $194.30; per capita time and saving deposits, $119.26.

Total resources of all banks at the beginning of 1928 were $193,127,975, an increase of about $17,000,000 over 1927 at the same date.

There were 2,663 people per bank in the State January 1, 1928.

State Banks.

The 132 state and two private banks showed an increase in deposits of approximately $10,000,000 over the period January 1, 1927, to January 1, 1928. The total deposits in state and private banks January 1, 1928, was $83,389,374; at the beginning of 1927, it was $72,668,367. In 1915 total deposits in state banks were $62,976,768; in 1920 $53,098,475.

Demand deposits in state banks totaled $53,441,303 at the beginning of 1928 compared with $44,710,492 in 1927 and $30,323,987 in 1920. Time and savings deposits in state banks totaled $29,948,070, an increase of $1,990,195 from $27,957,875 in January, 1927, and of $7,173,582 from $22,774,488 in 1921.

The resources of state banks at the beginning of 1928 were given at $92,947,975; they were $86,292,527 at the beginning of 1927.

National Banks.

Deposits in the 71 national banks showed a total of $87,843,000 the first day of January, 1928, of which $52,709,000 were demand deposits and $35,134,000 were time and savings deposits. This shows an increase of about $9,500,000 over 1927, according to the He'ena branch of the Federal Reserve Bank of Minneapolis.

Resources of national banks in the state totaled $100,180,000 on January 1, 1928. In December, 1926, they were a little over $90,000,000, showing an increase of about $10,000,000.

Average Deposits.

The average deposits per bank among national banks in Montana in 1928 was $1,237,225; the average in state banks was $622,308; for all banks in the state the average was $835,279.

COMMERCIAL MONTANA

Many Firms in Business 60 Years Ago Still on R. G. Dun's Records—Commercial Failures Now Few—9,688 Mercantile Establishments.

Montana business conditions have been rapidly improving the past five years. Five years ago in 1922, 224 commercial failures involving $3,357,117, were recorded by the mercantile agency of R. C. Dun and Company. In 1928, after a five years' steady decline in the amount of money involved in failures (see table) 122 carried liabilities of $926,020, making present conditions comparable to the prosperous pre-war years of 1910 and 1915 when failures recorded involved liabilities of $744,294 and $1,366,666 respectively.

For the past ten months the white blanket of prosperity has been spread over the major portion of Montana on the business map of the United States published by the United States Chamber of Commerce, and showing in white the good business sectors of the nation.

The state's general agricultural position as well as its magnificent livestock outlook, its increasing importance in the oil industry and its active mining, metal refining, lumbering and power industries are a l contributing elements to the general business prosperity.

Early Day Merchants.

It is hard to realize as we view Montana with the eyes of Today that it is only a little more than sixty years ago that the first mercantile establishments were opened for business in the then Territory of Montana. The first authentic record is that of R. G. Dun and Company, who first compiled and published a list of Montana merchants in 1867—four years after Alder Gulch was discovered. While this list was not complete, it is interesting to note that it showed 82 mercantile houses located in eight towns, the greater number being in Helena and Virginia City; a number of the merchants operating stores in both places, thus taking advantage of the trade of the two great gold camps, Alder and Last Chance Gulches, the latter being the present site of Helena.

In 1875 Dun listed in Montana 292 merchants, located in 50 towns and villages. Many of the towns and villages mentioned in this directory are no longer in existence, having been moved away or deserted when the ore bodies which were responsible for their foundation were workd out, or ceased to pay large returns.

The majority of the merchants operating in the seventies were very successful and some of the names appearing in the directories then are to be found in the directory of today.

Montana Failures, Mercantile.

(Data by R. G. Dun and Company.)

YEAR	Number of Merchants	Number of Failures	Assets	Liabilities
1910	6,065	129	$ 632,414	$ 744,294
1915	10,363	64	1,240,174	1,366,666
1922	10,621	224	2,091,566	3,357,117
1923	10,696	216	1,873,927	2,828,393
1924	9,749	166	1,256,483	2,015,033
1925	9,694	164	963,045	1,580,834
1926	9,435	166	1,093,833	1,234,019
1927	9,688	122	704,230	926,020

Montana now has some of the most modern mercantile establishments of the West, and the newcomer should not expect to locate where he will have no competition or even poor competition. In all the leading cities of the State there are modern department stores of large size, and well selected stocks of merchandise. There also are specialty shops for the fastidious buyer, as well as hardware, automobile, and many other lines. And in the smaller towns there are general stores well equipped to care for the needs of their customers. Openings for newcomers will be found in many of the rapidly growing and prosperous

towns and cities, but the prospective new merchant will do well to study conditions locally to ascertain which communities have the resources to accommodate other business houses.

In this connection the following table, prepared from the 1928 commercial census of Montana taken by R. G. Dun and Company, is not only interesting but of great value in determining which counties are well supplied with various mercantile lines:

R. G. Dun's 1928 Commercial Census of Montana.

COUNTY	Genl. Mdse.	Gro. & Meat	Confec. Cigars Etc.	Elevators	Lumber	Auto & Gar.	Misc.	Total
Beaverhead ..	14	20	25	6	5	20	54	144
Big Horn	22	9	26	4	4	15	33	113
Blaine	29	11	19	12	8	13	34	126
Broadwater ...	12	5	10	5	2	5	16	55
Carbon	42	29	44	12	8	21	62	218
Carter	11	3	7	..	3	5	7	36
Cascade	28	119	110	21	12	64	417	771
Chouteau	22	14	37	29	10	16	26	154
Custer	23	33	34	9	7	30	73	209
Daniels	17	8	22	16	9	15	26	113
Dawson	26	19	28	8	5	18	56	160
Deer Lodge ..	9	49	46	..	2	27	65	198
Fallon	10	7	18	7	3	8	28	81
Fergus	44	36	61	43	15	39	144	382
Flathead	22	45	56	6	22	29	156	336
Gallatin	20	37	47	25	11	37	160	337
Garfield	10	9	6	1	1	5	6	38
Glacier.....	12	13	22	3	4	11	17	82
Golden Valley.	9	4	7	4	7	5	9	45
Granite	8	8	19	1	2	6	19	63
Hill	26	27	35	12	5	23	61	189
Jefferson	15	6	23	1	2	10	16	73
Judith Basin..	17	12	15	35	9	10	20	118
Lake	28	11	32	11	6	15	41	144
Lewis & Clark	28	55	64	5	5	36	209	402
Liberty	7	3	5	5	1	3	12	36
Lincoln	23	19	20	1	6	13	46	128
McCone	12	1	8	1	..	4	8	34
Madison	18	12	25	3	7	15	31	111
Meagher	10	6	16	3	4	10	13	62
Mineral	14	9	17	..	..	11	12	63
Missoula	18	62	60	4	13	48	166	371
Musselshell ..	20	23	20	6	4	22	55	159
Park	15	24	46	11	4	27	111	238
Petroleum ...	4	3	10	3	2	4	11	37
Phillips	25	19	13	9	6	12	42	126
Pondera	12	8	15	15	6	13	32	101
Powder River.	13	..	3	..	1	1	2	20
Powell	10	11	23	1	2	12	41	100
Prairie	5	4	9	5	4	8	18	53
Ravalli	17	16	26	4	4	18	74	159
Richland	16	14	25	14	9	9	53	140
Roosevelt	28	12	38	17	8	19	93	215
Rosebud	19	9	25	13	4	11	39	120
Sanders	22	6	25	2	5	14	33	107
Sheridan	25	12	40	29	12	21	73	212
Silver Bow ...	16	296	184	6	7	62	497	1068
Stillwater	21	12	15	12	4	13	35	112
Sweet Grass ..	7	6	11	3	2	9	23	61
Teton	18	8	18	21	6	11	36	118
Toole	21	16	41	13	9	15	52	167
Treasure	5	1	2	2	3	2	4	19
Wheatland ...	13	8	19	12	6	11	41	101
Valley	24	20	25	15	9	18	74	185
Wibaux.....	5	3	6	8	4	4	13	43
Yellowstone ..	29	88	81	20	21	80	276	595
Totals	996	1320	1693	534	340	1035	3771	9688

IRRIGATION IN MONTANA

Almost Two Million Acres Are Now Irrigated, With 1,000,000 Additional Acres Needing Settlers.

By J. S. James.

Irrigation has been practiced in Montana since 1841, when St. Mary's Mission was established by Father DeSmet at what is now Stevensville in the Bitter Root Valley. From this early beginning, methods and organization have been developed for the irrigation of more and more extensive tracts until now we have developed such projects as Flathead Indian project, serving some 125,000 acres, and the Valier "Carey Act" project, serving 80,000 acres.

This development has not been accomplished without trouble, disappointment and discouragement, but these experiences have taught their lessons, so that many hazards and losses may be avoided in the future. The early settler, locating his homestead along the creek, developed his irrigation system with capital consisting only of his horses and a few crude tools and the labor of himself and family. As the first choice locations were taken, the development of the lands further from the streams required cooperative enterprises to build the more expensive structures and ditches required. Through this growing need were developed partnerships, farmers' cooperative companies, stock companies, and, for the development of public lands, the "Carey Act," providing for construction of works by a corporation, under contract with the state and development by the United States Reclamation Service. Organization of large tracts of private land for irrigation development has been made possible under the Irrigation District law.

The following discussion of these different forms of organization is quoted from an article by Mr. C. S. Heidel, in last year's Montana Book.

THE CAREY ACT

On August 18, 1894, the Federal Carey Act was approved. The authorized grants of lands to the states upon condition that arrangements be made for their reclamation, settlement and cultivation. In an Act approved March 18, 1895, the Montana Legislature attempted to take advantage of the Carey Act. This legislation proved unsatisfactory, and a more elaborate law creating the State Arid Land Grant Commission was enacted and approved March 8, 1897. This commission attempted to reclaim the lands selected under the provisions of the Carey Act and colonize them. Construction by the state proved unsatisfactory, and in 1903 a law was passed abolishing the Arid Land Grant Commission and creating the Carey Land Act Board. This law was modified in 1905, leaving it practically the same as it is today.

Under the present Carey Act laws, persons or corporations who desire to reclaim lands of the public domain apply to the Carey Land Act Board, asking it to select the desired lands under the Carey Act. If the state officials approve the proposed project they apply to the United States requesting that the land in question be segregated or set aside from the public domain and withdrawn from homestead entry. After various requirements, including the reclamation of the land, are satisfactorily complied with, the state receives a patent to the land from the United States. The state in turn issues patents to individual settlers who establish residence on and cultivate the land and buy their water rights for their farms from the builders of the irrigation works. Approval and supervision of the projects by competent state officials assures an ample water supply and a substantial irrigation system. The Carey Land Act Board is composed of the governor, attorney general, and secretary of state. The state engineer is its official secretary.

BILLINGS PROJECT

The first project initiated was arid land grant district No. 1, later known as the Billings Carey project, irrigating lands between Billings and Shepherd on what is called the Billings Bench. Its first lands were segregated or withdrawn from public entry on December 3, 1897. Little was done in actual work until after the Carey Land Act Board was created and had supervision. The project was built at a cost of over a million dollars, covering 23,000 irrigable acres.

In 1920 the Carey Land Act Board relinquished all control over the irrigation system to the Billings Bench Water Association, which is composed of the water users. During the past few years water has been used on 17,000 acres and assessments of $2.00 per acre per year have been levied for operation and maintenance. Substantial homes and profitable farming have made this one of the most satisfactory projects in the state.

VALIER PROJECT

The Valier Carey project in Pondera county has sold water stock for nearly 70,000 acres and has actually been irrigating more than 60,000 acres. This is more than any other project in the state has irrigated. While there is more irrigable land under the canals in this project, the total acreage to be irrigated has been limited to 80,000 so as to insure an ample water supply. The construction cost has been over $4,000,000 and the irrigation works include about 500 miles of canals and numerous structures. The most interesting structure on the project is the Swift dam of rock-fill type, 160 feet high, on Birch Creek, about thirty-four miles west of Valier. In 1924 the total crop value on the Valier project was $869,170 and the value of improvements and livestock $1,257,105.

OTHER PROJECTS

Other Carey Act projects in Montana are the Big Timber project, in Sweet Grass county, the Flatwillow project, in Petroleum county, and the Little Missouri project, in Carter county. The five existing projects embrace a total irrigable area of over 150,000 acres. The three projects are actually irrigating over 80,000 acres of their total of about 120,000 irrigable acres.

At different times other Carey projects have been proposed and public lands temporarily withdrawn from entry, but for various reasons they have been relinquished. The last relinquishment was of the lands of the Teton project, near Brady. The original plan was to include all the irrigable land of a tract of about 160,000 acres, and a Carey Act segregation of 55,393 acres was withdrawn from entry in 1911. Plans were based on an insufficient record of stream flow, but about half a million dollars was spent on diversion works, canal and storage dam before it was realized that the water supply was less than supposed. In 1925 the remaining Carey lands of this project were relinquished and the water rights and constructed works of the Carey Act Company purchased by the Bynum Irrigation District.

FEDERAL RECLAMATION.

Following the earlier Carey Act developments, and contemporaneously with the later ones, the United States began the construction and settlement of irrigation projects. The Reclamation Act was passed in 1902 allowing proceeds from the sale of public lands to be used in the construction of federal projects, the cost of construction to be repaid by the settlers without interest. Reconnaissance and preliminary surveys were begun in 1902 for the Milk River project, in 1903 for the Lower Yellowstone project, 1904 for the Huntley project, in 1905 for the Sun River project, in 1907 for the Flathead and Blackfeet Indian projects, and in 1908 for the Fort Peck Indian project.

Lands were open for settlement as early as 1907 on the Huntley and 1908 on the Sun River and Lower Yellowstone projects. The Huntley project in Yellowstone county lies just across the Yellowstone River from the Billings Carey project, and is one of the most successful of the federal projects in the Rocky Mountain region. Water was available for 32,540 acres in 1924 and 19,600 acres were actually irrigated. It happens that over 12,000 acres of this project are considered temporarily unproductive because of the quality of the soil, so practically all the good irrigable land was in production that year.

Other federal projects are the Milk River project, which was able to irrigate 107,800 acres in 1924; the Sun River project, able to supply water to 57,160 acres in 1924, and the Lower Yellowstone project, which was able to supply water to 58,000 acres in 1924. The lower end of this project extends into North Dakota.

The four federal projects which have been mentioned were constructed by the United States Reclamation Service, which, in 1923, was succeeded by the Bureau of Reclamation. The Reclamation Service also constructed three Indian projects: the Flathead, the Blackfeet and the Fort Peck projects. These are now under the control of and are operated by the engineers of the Office of Indian Affairs.

IRRIGATION INCREASES LAND VALUES.

Figures on assessed values will show the importance to the community of irrigated land. These may be found in the annual reports of the State Board of Equalization.

OPPORTUNITIES FOR HOMESEEKERS.

Montana has probably a total of 2,000,000 acres now irrigated, with works contemplated for nearly an additional 1,000,000 acres. There are probably 200,000 acres of irrigable land not being farmed. Various estimates of the total area that can be irrigated run from 5,000,000 to 7,000,000 acres. There are numerous beautiful valleys where farms may be secured that will be profitable and highly satisfactory to the right class of settlers. Mills, creameries, cheese factories, canneries, apple packing plants, sugar factories and marketing associations all contribute to the prosperity of farmers on Montana's irrigated lands. Her apples go to New York and her butter to California, her seed potatoes to the south and her seed peas to Wisconsin. Arrangements have been made to finance settlers on certain of the irrigated projects in the purchase of sheep and dairy cattle which have recently been paying large dividends. Easier terms of repayments on federal projects and irrigation districts combined with a delightful climate, fertile soil and developed markets make Montana a land of promise to prospective settlers desiring irrigated land.

With irrigation works now provided for more than is being farmed under irrigation, the immediate problem is the development of the irrigated farm. This problem is being successfully answered by sane, home building colonization looking to the upbuilding of communities and their future prosperity, rather than to speculative profits. This broad policy increases the confidence with which the home seeker approaches the problem of selecting a location.

LAND IN MONTANA

Day of Good Homestead Land Over—State Protects Buyer by Adequate Real Estate Laws.

There is a little good land left in Montana that is open to homestead entry but it lies in most instances 40 to 100 miles from the railroad and the cost of marketing crops that distance would eat up all the profits. To make a success on such a farm a man would require livestock. The person that has the money with which to buy livestock could do better by leasing, renting or buying a farm closer to the railroad.

For these reasons the division of publicity and land settlement no longer advises prospective settlers to come to Montana with the idea of making homestead entry. The day of good homestead land is over in Montana.

In the purchase of land Montana offers opportunities not excelled in any other commonwealth, and for the protection of buyers, the state has an advanced real estate law, affording genuine protection against misrepresentation by the unscrupulous broker. Briefly the law requires that before one may legally engage in the real estate business in Montana, he must first apply for a license, making application with the division of publicity and real estate. Before a license is granted the applicant must submit satisfactory references from at least five freeholders in his county. A bond from each dealer in the sum of $1 000 is required. All bonded brokers are liable for misrepresentation to the full extent of their bonds.

There are two United States land offices in Montana. They are located at Billings and Great Falls. According to the report of the general land office there are about 6,000,000 acres of vacant public land in Montana. The land in the vicinity of Billings is described as rough mountainous and grazing with some farming in Carbon County; in the Great Falls district, the land is grazing, hilly, mountainous and agricultural.

Information as to whether a particular tract of land is subject to entry may be obtained from the register of the land district in which the tract is located, either through verbal or written inquiry, but these officers must not be expected to give information as to the character and quality of unentered land or to furnish extended lists of lands subject to entry, except through plats and diagrams which they are authorized to make and sell as follows: For a township diagram showing entered land only, $1.00; for a township plat showing form of entries, names of claimants, and character of entries, $2.00; for a township plat showing form of entries, names of claimants character of entry, and number, $3.00; for a township plat showing form of entries, names of claimants, character of entry, number, and date of filing or entry, together with topography, etc., $4.00.

Purchasers of township diagrams are entitled to definite information as to whether each smallest legal subdivision, or lot, is vacant public land. Registers are therefore, required in case of an application for a township diagram showing vacant lands to plainly check off with a cross every lot or smallest legal subdivision in the township which is not vacant, leaving the vacant tracts unchecked.

If because of the pressure of current business relating to the entry of lands, registers are unable to make the plats or diagrams mentioned above, they may refuse to furnish the same and return the fee to the applicant, advising him of their reason for not furnishing the plats requested, that he may make the plats or diagrams himself or have some made by his agent or attorney, and that he may have access to the plats and tract books of the local land office for this purpose, provided such use of records will not interfere with the ordinary dispatch of the public business.

The only special privilege granted soldiers or sailors is that time in the service counts as residence upon a homestead. However, one year's residence must be put in upon a homestead. Three years is the required length of residence with a five months' leave of absence allowed each year so that the net residence is seven months out of every 12.

MONTANA PRODUCTS LEAD WORLD

Career of Prize Winning Begins as Far Back as 1893—State Again Sets New International Record at Chicago in 1927.

Montana products exhibited in competition with the products of other commonwealths have had an enviable reputation for prize winning for nearly half a century. As early as 1893, at the Chicago Exposition, besides mining awards for gold nuggets, crystals and placer gold, for copper ores and for building stone, this State won distinguished recognition for its agricultural products, awards being made to Montana on apples, flaxseed, oats and hay.

At the Louisiana Purchase Exposition, held at St. Louis in 1904, the grand prize for the mining industry was won by the State of Montana. For agricultural exhibits from Montana there were received sixty-nine gold medals, sixty-two silver medals and fifty-three bronze medals.

In 1905 at the Lewis and Clark Centennial Exposition held at Portland, Oregon, Montana was awarded the gold medal for an education exhibit, a gold medal for a collective exhibit of grains and grasses, and two gold medals for mineral exhibits.

Out of twelve sweepstakes offered at the Dry Farming Congress in Tulsa, Oklahoma, in 1913, Montana won four, with every section of the continent competing.

The superiority of many of Montana's products from farms, mines, manufacturing establishments and forests, was again demonstrated in 1915 at the California Expositions. A recapitulation of Montana's winnings at the Panama-Pacific International Exposition, San Francisco, 1915, and at the Panama-California Exposition at San Diego, 1915, follows:

	Grand Prize	Medal of Honor	Gold Medals	Silver Medals	Bronze Medals	Honorable Mention
Agriculture, P. P. I. E.	1	12	77	240	199	98
Miscellaneous	..	..	1	3	8	1
San Diego	1	..	15	..	..	..
Horticulture, P. P. I. E. ...	1	1	10	27	17	14
Total	3	13	103	270	224	113

Grand Total .....726 Awards

Montana has been a consistent winner at the International Grain and Hay Show held annually at Chicago. Since 1919 when the first Montana exhibit was placed at the International, the State has carried off an average of over 31 per cent of the prize money in classes entered. The graph on this page shows the Montana winning by summary for nine successive years.

The 1927 International marks the crowning achievement in Montana's long career of prize winning. With about 225 entries in the grain division, Montana won 125 awards.

The champion sample of wheat, world sweepstakes, was won by C. Edson Smith, Corvallis, Ravalli County.

In hard red winter wheat, Montana won the first seven places; 12 out of the first 13, and a total of fifteen places out of a possible 28. In hard red spring wheat, four out of the first six places, a total of 12 out of a possible 35.

In Durum wheat, with 12 awards offered, Montana won eleven, losing only the ninth place.

In white spring wheat Montana won the first ten places, in all, 11 out of a possible 15, and in soft red winter wheat six out of sixteen places.

World championship and reserve championship, and 31 out of a possible 41 places were won in barley classes by Montana samples, and in oats, the reserve championship and 15 out of a possible 35 places.

In flint corn Montana won one out of a possible nine places, in field peas, one out of four; in flax, the world championship and four out of a possible ten places, and in rye 10 out of 21 places. In small seed classes alfalfa and timothy, Montana won five out of ten places.

Livestock Division.

Montana's winnings in the livestock division at the 1927 International Livestock Exposition were as follows:

SHORTHORNS—Childs & Anceny, Gallatin county—First, cow; second, senior yearling heifer; third, junior heifer; fourth, aged cow; fourth, two-year-old bull; sixth, summer yearling; sixth, junior yearling; eighth, senior bull; eighth, senior yearling bull; second, aged herd; sixth, get of sire; eighth, yearling herd.

HEREFORDS—A. B| Cook, Broadwater county—Flrst, junior yearling steer; third, group of three steers; third, aged bull; third, two-year-old bull; fourth, senior yearling bull; sixth, junior yearling bull; fourth, summer yearling bull; third, three yearling bulls; first, summer yearling heifer; second, two-year-old heifer; fifth, junior yearling heifer; seventh, aged cow; seventh, junior heifer calf; third, group of two females; third, aged herd; third, get of sire.

HAMPSHIRE SHEEP—Mt. Haggin Land and Livestock Company, Deer Lodge county—Dr. H. C. Gardiner, Manager—First, ewe lamb; first, yearling ewe; third, yearling ewe; second, yearling ram; second, pen of three ram lambs; second, pen of three ewe lambs; third, ram lamb; fifth, ram lamb; first, flock.

Tom Drummond, shepherd of the Mt. Haggin flock, won the gold medal as the best shepherd of all states in competition.

At the Pacific International Livestock Show in Portland, Oregon, October, 1927, Montana won a total of 90 awards including four grand championships, three reserve champions, 23 firsts, 20 seconds, and 14 thirds. At the American Royal Livestock and Horse show at Kansas City, Missouri, a Montana herd won first in the Hereford get-of-sire class.

Fur Farming.

In fur farming, as in so many of the other industries, Montana products rank high. At the Western Division-American National Fox Show held in Portland in the fall of 1927, one of the state's foremost fur farms won eleven awards out of twelve, taking three first places, two seconds, one color champion, etc., on silver foxes.

The commissioner of Agriculture, Labor and Industry has supervision of exhibits of the state at fairs and expositions. This is true of the State Fair held each year at Helena, and of exhibits outside of the State.

FARM CROPS—HISTORICAL SKETCH

Number of Farms Increase from 851 in 1870, to 5,603 in 1890, to 13,370 in 1909 and to 48,000 in 1928.

By Chas. D. Greenfield, Jr.

Father DeSmet, a Catholic missionary to the Indians, was Montana's first husbandman. In 1845 he seeded a patch of ground to grains and vegetables at St. Mary's Mission in the Bitter Root Valley, near the present town of Stevensville. A few farms were established in the same valley in the next two decades. The first considerable influx of people to Montana Territory was precipitated by the Alder Gulch gold discovery in 1863. A few turned to agriculture.

In 1864 there were a few farms on the eastern slope of the Rockies, and a few in the Bitter Root Valley. The first homestead entry in Montana was made by David D. Carpenter on an application to the Helena land office, filed August 1, 1868. Patent was issued February 10, 1871 for 150.55 acres. Part of this tract is now embraced in the grounds of the Lewis and Clark county hospital.

The first official mention of farm and livestock wealth for the state is found in the first report of the territorial auditor, "up to December 4, 1865." In the counties of Madison, Edgerton (now Lewis and Clark), Beaverhead, and Gallatin, a total of 82,706 acres were "claimed."

Improvements were valued at $128,369.

Mining Stimulates Agriculture.

By 1870 there were 851 farms in the territory, according to the federal census. They contained 139,537 acres of which 84 674 acres were reported improved. Only one-tenth of one per cent of the state's total area was devoted to agricultural purposes. This small fraction was divided among a few districts, most of them in close proximity to the mining camps. One was in the Bitter Root, another near Missoula, one near Madison and another near the Beaverhead county mining camps. Farming had started in the Prickly Pear Valley near Helena and on the Sun River near Fort Shaw. There were four farms in Chouteau county, near Fort Benton, and, according to the census returns, there was one lone farmer in Custer county which comprised at that time the eastern half of the territory. He lived under the walls of Fort Peck where the Poplar river empties into the Missouri. The agricultural possibilities of the Gallatin were the first to be generally appreciated in 1870 that county leading in the number of farms, 178, as well as in the total value of farm products. Jefferson had 141 farms, Lewis and Clark 106, Deer Lodge 105, and Madison 102. Deer Lodge led in improved acreage, closely followed by Lewis and Clark and Meagher counties. Then came Jefferson, Missoula and Gallatin. In the cash value of farms, Lewis and Clark ranked first, followed by Deer Lodge and then Gallatin. Nearly half the total wheat and oat production of the territory in 1870 was from Gallatin county. There were three flour mills in that county, three in Missoula and one in Madison county.

During the next ten years the number of farms or more properly, ranches, in the territory more than doubled, the principal increases being in Madison, Missoula, Custer, Chouteau, Meagher and Lewis and Clark counties. The Fort Peck farmer abandoned operations, there was a net decline of three farms in Gallatin county in this decade and a pronounced decline in Jefferson county. The Meagher expansion was in the Judith Basin and the Custer along the Yellowstone. The production of ranch butter declined, probably because of the wane of the mining districts and the growth of transportation facilities. Wheat, which was the chief crop in 1870, was superseded by oats in 1880, the stage lines and military posts affording a home market for it.

Railroads Benefit Stock Raising.

These ranch settlements were devoted chiefly to livestock raising, although the crop production of the territory was sufficient for the needs of the sparse population. Reports of the territorial governors and of the United States sur-

veyor-generals mention the big agricultural possibilities of the territory but dwell upon the necessity of rail transportation to provide a market outlet before these possibilities could be realized upon. Farming remained at a standstill but stock raising developed. The building and operation of the Utah Northern from Ogden, Utah, to Garrison in 1880 gave stock growing an impetus in the western part of the state, as did the construction in 1883 of the Northern Pacific to the industry in the eastern part of the state. Prior to the building of the Northern Pacific, marauding Indians made stock growing in eastern Montana a hazardous undertaking.

In the decade from 1880 to 1890 rural settlements spread out along the Yellowstone as far east as Glendive, through the Big Horn and Powder River regions, in two districts in the Milk River valley, and in the Flathead country around Kalispell.

One of the material factors in the development of the eastern part of the territory in this decade was the elimination of approximately 20,000,000 acres from Indian reservations. This acreage—a little less than one-fourth of the total for Montana—was added to the public domain. Stockmen seized the opportunity. Ranges were extensively stocked with cattle, and later, with sheep. It was a period of inflation when eastern and foreign capital was poured into the range herds. Bottom lands along the streams were acquired by big cattle concerns. As early as 1883 registers and receivers of U. S. Land offices in the state called attention to the practice by cattle companies of having their riders and friends file upon such lands under the desert land act. The company put the water upon the land, the entryman proved up, received his patent and then transferred the tract to the company. The desert land act was passed in 1877 and in the next four years there were 370 desert claim filings made in the territory of Montana, covering 122,461 acres. In the same period there were 608 homestead entries but covering only 93,671 acres.

Advent of Non-Irrigated Farming

The number of farms increased from 851 in 1870 to 1,519 in 1880, to 5,603 in 1890 and to 13,370 in 1909. At the beginning of 1928 the number of farms is estimated at about 48,000.

In 1880 there were 262,611 acres of improved farm land in the state which had increased to 915,517 acres in 1890, of which two-fifths were irrigated. In 1900 there were 1,736,701 acres of improved farm land, more than one-half of which was irrigated. During the course of the next ten years the non-irrigated farmer made his appearance, and of 3,640,309 acres of improved farm land, a trifle less than one-half was irrigated. By 1920 the federal census reported 11,007,278 acres of improved farm land in the state of which only fifteen per cent was under irrigation ditches.

In 1900 there was little farming done in Montana east of Yellowstone county, except for a narrow strip in the lower Yellowstone valley. There was practically no farming in northern Montana except in the Milk River valley. By 1910 the non-irrigated table lands back of the main valleys were being farmed. In the next ten years every county in the state, east of Flathead, Lewis and Clark, Broadwater and Park, with the exception of Cascade, showed an increase in rural population of 50 per cent or over. That year 37.5 per cent of the state's total area was devoted to farms, compared with one-tenth of one per cent in 1870.

Original homestead entries made in Montana reflect the development of agriculture. Filings increased following each new railroad built into or through the state, but the lands taken up were not confined to territory close to the rails. The year 1910 holds the record for homestead filings in the state, when 21,982 filings were recorded, covering 4 732,806 acres. Filings for the next seven years continued to be very large, but beginning with 1918, the number of filings markedly decreased.

Nearly all of the total acreage filed upon in the state for agricultural purposes has been taken up under the general homestead laws, and but little under the desert land act and the stockraising homestead act.

The earliest estimate available on agricultural production in Montana was made by the United States Surveyor General for the year 1869, and included the following: wheat, $900,000; barley and oats, $500,000; potatoes, $1,000.000; hay, $200,000; vegetables, $75,000; poultry and eggs, $100,000; dairy products, $400,000; total, $3,175,000.

THE INDUSTRIES OF MONTANA

The industries of Montana in the order of importance as gauged by the sales value of products are: (1) Farming, including the production of livestock; (2) Manufacturing; (3) Mining, including coal mining and petroleum and (4) lumbering. Combined value of output of these industries, together with miscellaneous sources of income, is estimated at $365,447,000, for 1927; $331,065,000 for 1926, and $319,741,000, for 1925.

The story of the years in figures is given below:

VALUE OF OUTPUT OF MONTANA INDUSTRIES (1880-1928)

The following table estimates the value of the products of Montana by years, from 1880 to 1927, inclusive. It is not intended that these total figures shall be considered as absolutely accurate. They are, at best, merely a rough estimate.

	Farm Products $(000)	Livestock Marketed $(000)	Lumber $(000)	Manufacture (Value Add.) $(000)	Metal Mines Production $(000)	Total Value all Products (000 omitted)
1880	3,000	3,650	593	**	211,000*	$ 7,243
1881	3,300	5,000?	659	**	**	8,959
1882	3,687	7,000?	724	**	8,460	19,871
1883	3,503	9,236	790	**	11,479	25,008
1884	4,420	14,822	855	**	14,803	34,900
1885	4,600	20,409	921	**	21,954	47,874
1886	5,050	20,907	986	**	24,526	51,469
1887	6,755	21,406	1,052	**	33,257	62,470
1888	5,694	21,903	1,117	**	35,664	64,378
1889	7,295	22,401	1,183	**	36,686	67,565
1890	8,891	22,901	1,295	**	43,030	76,117
1891	8,380	22,256	1,406	**	38,636	70,678
1892	5,836	21,609	1,519	**	45,419	74,383
1893	6,420	20,962	1,631	**	43,030	72,043
1894	5,878	20,315	1,743	**	38,191	66,127
1895	6,415	19,668	1,855	**	49,083	77,021
1896	6,356	23,968	1,967	**	50,732	83,023
1897	7,803	28,268	2,079	**	53,955	92,105
1898	6,986	32,568	2,192	**	51,319	93,065
1899	7,593	36,869	2,304	22,677	68,457	137,900
1900	9,268	41,169	2,349	22,238	**	125,024
1901	11,283	41,304	2,395	23,800	**	128,782
1902	10,745	40,281	2,441	24,361	**	127,828
1903	14,281	39,256	2,487	24,992	**	131,016
1904	14,786	38,231	2,535	25,485	**	131,036
1905	12,988	37,206	2,309	25,205	65,501(a)	143,209
1906	16,301	43,334	4,375	24,927	74,127	163,064
1907	22,096	49,462	4,951	24,649	60,664	161,822
1908	23,141	55,590	4,256	24,371	46,804	154,162
1909	29,863	61,719	4,447	24,092	57,493	177,614
1910	38,918	67,848	4,429	26,814	54,388	192,397
1911	50,624	71,157	2,951	29,536	53,498	207,766
1912	49,381	74,466	3,631	32,258	71,621	231,357
1913	54,118	77,775	5,360	34,980	69,307	241,540
1914	70,020	81,084	4,354	37,702	54,245	247,405
1915	82,093	84,395	4,035	39,064	89,147	298,734
1916	127,515	103,078	5,209	40,426	142,650	418,878
1917	108,784	121,761	6,019	41,788	123,733	402,085
1918	140,276	140,444	7,376	43,150	139,332	470,578
1919	69,975	125,502	6,294	44,513	73,631	319,915
1920	105,700	110,660	13,269	38,059	85,886	353,574
1921	81,430	80,700	5,842	31,605	30,162	229,739
1922	93,580	67,200	7,122	38,888	59,871	266,661
1923	100,536	50,872	11,373	46,172	58,487(b)	267,440
1924	126,396	50,131	8,496	52,647	56,014(b)	293,684
1925	110,190	65,173	4,650†	51,500	63,000	319,741
1926	107,188	71,001	4,650†	57,000	61,500	331,065
1927	149,031	67,049	4,650†	65,000	50,000	365,447

*Total Value (1862-1882).

**Data Unavailable.

(a) Values of minerals prior to 1905 are for Gold, Silver, Copper and Lead only. Values for 1905 and following years are for the same minerals with the addition of Coal, Zinc, Precious Stones, Manganese, Petroleum, Gas.

(b) For Gold, Silver, Copper and Lead only.

†Value of timber cut only. Duplication in the tables is confined to the agricultural industry. The value of crops fed to livestock before marketing is not deducted.

FARMING IN MONTANA

More Than Eight Million Acres Seeded to Crops in 1928—All Stages of Diversification and Specialization Represented.

Montana farms during the season of 1927, numbering about 48,000, less than one per cent of the nation's total, harvested about 1.8 per cent of the country's crop acreage and produced about 1.6 per cent of the nation's crop value.

Our farms are our greatest asset, and 1927 was Montana's greatest agricultural year. Against a reduction of about 18 per cent in man-power since 1920 and in spite of the heavy handicap of lower prices, our planted acreage was the largest, about 7,700,000 and tonnage produced by far the largest, 7,558,000 tons compared with the previous record of 5,396,660 tons in 1924. Combined value of all crops was the largest, about $150,000,000 compared with about $130,000,000 in 1924.

Montana's best was the nation's best, for throughout the season Montana led all other states by a wide margin in the composite of crop condition and yield. Montana was rated at the close of the season by the United States department of agriculture with a composite yield of 157 per cent of the average for the previous ten years. The composite for the United States was 102 per cent. Nebraska ranked second among the states with a composite of 126, North Dakota third, with 123, and Idaho fourth with 120 per cent.

Revised figures show the following production in ten of the principal crops: wheat, 79,702,000 bushels; hay, 3,701,000 tons; oats, 23,840,000 bushels; potatoes, 5,400,000 bushels; barley, 6,435,000 bushels; rye, 2,412,000 bushels; flaxseed, 2,438,000 bushels; corn 7,168,000 bushels; beans, 935,000 bushels; sugar beets, 396,000 tons.

In the beginning of 1928, Montana was exceeded in wheat production by but two states, North Dakota and Kansas. If our acreage continues to expand we should in less than a decade be the leading wheat producing state.

Montana's production was 79,702,000 bushels compared with 124,000,000 bushels for North Dakota and 111,000,000 bushels for Kansas. Montana exceeded both of these states in per acre yield, producing about 21 bushels compared with 13 bushels in North Dakota and 11 bushels in Kansas. Montana also exceeded both states in quality when judged either on the basis of protein content or percentage of wheat in the number one, federal grade. The 1927 Montana crop ran slightly lower in protein than average, but was approximately one per cent higher than North Dakota and two per cent above Kansas.

This year, 1928, Montana has approximately 8,200,000 acres seeded to crops. As this is written, (August) indications are that the crop will about equal the 1927 record.

While making tremendous acreage expansions in the face of heavy reduction in manpower, agricultural Montana is rapidly diversifying. A picture of the industry today would show almost every stage of diversification and specialization. Power farming especially is making possible heavy expansion of wheat acreage.

WHEAT

From 3,827,000 acres of wheat—the largest acreage in our history—Montana in 1927 produced 79,700,000 bushels, a record for the state when compared with the next best year, 1922, with a production of 52,704,000 bushels. Our wheat crop was worth $76,623,000, based upon a valuation as estimated by the United States department of agriculture of 97 cents per bushel for spring wheat and 92 cents per bushel for winter wheat.

In 1918 with war prices prevailing, this crop estimated at about 34,000,000 bushels was worth about $64,000,000, the previous record. Wheat is the most important crop in acreage and total value since 1914, when it superseded hay.

The 1927 season brought little trouble to the growers from diseases affecting wheat. Some rust was reported but damage to the crop as a whole was small. Loss from smut, cut worms, grasshoppers and other pests was less than average. Damage from moisture however, was above normal.

Wheat was worth $20.24 per acre to the 32,000 Montana farmers growing the staple in 1927, compared with $14.98 in 1926. The financial benefit derived from this tremendous production was spread to all parts of the state, since wheat is grown extensively in all sections. More than one-half of our 56 counties will ship more than 1,000,000 bushels each. Chouteau county leads in production with 5,500,000 bushels. The next ten counties are Fergus, Hill, Sheridan, Teton, Daniels, Valley, Judith Basin, Cascade, Pondera, Richland.

In the period from 1900 to 1910, the wheat crop increased about four times until at the end of the decade production was a little more than 6,000,000 bushels and Montana stood 23rd among the states in value of wheat output. During the next 14 years Montana passed 17 states and by 1923 ranked fifth. In 1924 we moved up to fourth place. Two states exceeded Montana in wheat production in 1927.

The state produces about nine per cent of the nation's wheat. In 1927 we produced about 20 per cent of the nation's spring wheat and stood second among the states in spring wheat production. Revised figures give Montana 65,952,000 bushels and North Dakota, premier spring wheat state 124,000,000 bushels.

In winter wheat Montana stands thirteenth with a production of 13,750,000 bushels. In Durum wheat Montana is rated fourth and production placed at 300,000 bushels, an increase from 120,000 in 1926.

In acreage Montana ranks third. In yield Montana stands first, in Durum wheat; fourth in spring wheat and in winted wheat eighth. It is significant that states out-yielding Montana have little production.

Production of wheat in Montana is almost certain to continue to expand. In 1928 we will harvest about 4,200,000 acres, an increase of about half a million acres, when compared with 1927. Acreage in North Dakota in 1927 was 9,846,000 and Kansas 9,936,000 acres.

It is of interest to note that measured by man labor required, wheat production is now most efficient of any enterprise engaged in the production of human food. More food is produced per hour of human labor in the United States than in any other part of the world or ever before in the world's history. Montana produces more than her share of food per hour of labor. This efficiency has been brought about by labor saving machines and these machines now produce such spectacular results that it takes only about thirty minutes of man labor to produce a bushel of wheat, on a power equipped farm.

It takes about the same amount of labor to produce an acre of wheat as an acre of corn but since most corn is returned as human food indirectly by being first fed to work animals or to cattle or other farm animals, the amount of labor involved before the finished product reaches the consumer is much greater.

According to the last government bulletin (two years old), the farmers of Montana used more power per farm worker than any state but two while the value of crops produced per man puts Montana in third place. As a measure of power used, Montana has about fifteen horse power at hand for each worker; Kansas, ten and one-half; Alabama, one, and Connecticut, five.

During the last two years the tractor has made a permanent place for itself on about one-fourth of the Montana farms. So long as the state grows the great crop of wheat as in recent years, power farming will increase and inevitably there will be fewer horses and more tractors and labor saving machinery as a solution to profitable wheat growing.

Both winter and spring wheat are grown in Montana. In 1909 the production of winter wheat at 3,213,000 slightly exceeded that of spring wheat with 3,039,000 bushels. Spring wheat acreage, however, at that time was slightly larger than that of winter wheat and since that time has strongly increased its lead. By 1915 winter wheat reached a peak with 840,000 acres and its tendency since that time has been mostly downward. Spring wheat by 1915 had reached 1,575,000 acres and its tendency since has been sharply upwards. By 1924 spring wheat acreage was 3,163,000 acres against 620,000 for winter wheat. In 1925 spring wheat acreage further increased partly due to the heavy winter killing of the winter wheat acreage which was reduced by this loss to 195,000 acres.

From the foregoing comparisons it is evident that spring wheat has surpassed winter wheat as the choice of Montana farmers. This is due mainly to the restricted area in which winter wheat may be safely grown from the standpoint of survival of winter compared with the statewide range of spring wheat.

Central and south central Montana, however, are suited to winter wheat requirements and with the higher yields generally secured from winter wheat and the opportunity it offers for a better distribution of labor, this area promises to continue to be an important producer of the winter varieties.

The most important varieties of winter wheat grown in Montana are Turkey Red, Kharkov, Kanrad and Montana 36. The hard red winter varieties grown in Montana are of excellent milling qualities.

Most of the spring wheat is grown on non-irrigated land. The principal variety is Marquis, a hard milling wheat that attains a high quality under Montana growing conditions.

Spring wheat is grown extensively in all sections of the State, but the extreme north-eastern Counties constitute the heaviest producing area. A small percentage of Durum, or macaroni, wheat is grown in the eastern half of the state and is included in spring wheat production figures.

ALL WHEAT BY YEARS
1882-1927

YEAR	Total Acreage All Wheat	Average Yield Per Acre (bu.)	Total Production (bushels)	Farm Price Per Bushel Dec. 1	Farm Value Dec. 1
1882	42,812	16.0	685,000	$1.45	$ 993,250
1883	57,796	16.3	942,000	.92	866,640
1884	76,240	18.0	1,372,000	.70	960,400
1885	83,864	20.4	1,715,000	.77	1,320,550
1886	88,896	17.0	1,509,000	.75	1,131,750
1887	97,786	18.0	1,760,000	.76	1,337,600
1888	121,255	16.5	2,001,000	.85	1,700,850
1889	85,000	18.1	1,539,000	.75	1,153,875
1890	87,500	17.0	1,488,000	.80	1,190,680
1891	92,803	20.0	1,856,000	.84	1,559,090
1892	41,761	21.5	898,000	.69	619,525
1893	43,431	21.5	933,767	.60	560,260
1894	44,828	24.8	1,111,735	.54	600,337
1895	44,570	23.9	1,065,223	.73	777,613
1896	45,443	26.5	1,204,240	.66	794,798
1897	69,792	32.5	2,268,240	.68	1,542,403
1898	71,188	29.5	2,100,046	.58	1,218,027
1899	69,764	25.7	1,792,935	.61	1,093,690
1900	72,555	26.6	1,929,963	.61	1,177,277
1901	88,807	26.5	2,353,386	.67	1,576,769
1902	90,583	26.0	2,355,158	.62	1,460,198
1903	98,735	28.2	2,784,327	.66	1,837,656
1904	108,608	23.9	2,596,731	.89	2,311,091
1905	119,469	23.8	2,843,362	.71	2,018,787
1906	137,389	24.0	3,297,336	.64	2,110,295
1907	139,000	28.8	4,003,000	.81	3,243,000
1908	153,000	24.2	3,703,000	.86	3,185,000
1909	259,000	24.1	6,252,000	.87	5,639,000
1910	415,000*	21.4	8,885,000	.86	7,541,000
1911	609,000*	24.5	14,935,000	.77	11,500,000
1912	1,055,000*	20.3*	21,417,000	.64	13,707,000
1913	1,300,000*	20.1*	26,088,000	.66	17,218,000
1914	1,596,000*	16.8*	26,821,000	.91	24,407,000
1915	2,415,000*	18.4*	44,413,000	.78	34,642,000
1916	2,440,000*	15.4*	37,632,000	1.61	60,587,000
1917	2,884,000*	7.3*	20,934,000	1.92	40,193,000
1918	3,485,000*	9.5*	33,365,000	1.94	64,728,000
1919	3,621,000	2.7	9,889,000	2.35	23,239,000
1920	2,787,000	10.3	28,690,000	1.28	36,723,000
1921	2,715,000	12.3	33,430,000	.85	28,416,000
1922	3,618,000	14.5	52,714,000	.89	46,916,000
1923	3,274,000	14.6	47,708,000	1.82	39,121,000
1924	3,163,000	16.4	51,799,000	1.24	64,230,000
1925	3,250,000	10.8	35,021,000	1.39	48,802,000
1926	3,595,000	12.3	44,665,000	1.12	50,095,000
1927	3,827,000	20.8	79,702,000	.96	76,623,000

* Tentative revisions.

MINOR CROPS

Corn in Montana Shows Acreage Increase from 50,000 Acres in 1914 to More Than 300,000 in 1928.

By J. G. DIAMOND

Corn acreage has made a remarkable expansion in Montana during the past fourteen years, increasing from about 50,000 acres in 1914 to about 305,000 acres in 1927.

The importance of the development of the corn crop in Montana does not lie in its contribution as a cash grain crop, the percentage used in this way being very small, but in the fact that in corn the Montana farmer has found a valuable feed crop for his farm animals as well as an alternative crop for his small grain acreage, which improves soil and helps control weeds, which inevitably follow intensive small grain farming.

Tying up with the increase in corn acreage are such important changes as big gains in farm breeding of hogs, and a general increase in the number of milk cows on farms. In the increase, therefore, of corn acreage is to be seen the drift of Montana farming from the older type of grain farming, often called the single crop system, to a more diversified type permitting the smaller sized farms.

While this drift may have limits which will ultimately check the rapid rate increase in corn acreage, most observers predict for corn an important place in Montana agriculture tying up with a further large expansion in dairy production and hogs.

Several varieties of Dent and Flint corn adapted to Montana conditions have already proven very satisfactory yielders, under average conditions, and there is reason to believe that plant breeders will continue to improve types to better fit Montana climate. Silage yields of corn have frequently attained high averages in Montana, and this utilization is developing with the increasing needs of the growing dairy industry.

Corn, by reason of its drouth and hot weather resistance, offers an excellent offset to the average risk of these factors in wheat productions. Corn land, also, provides an excellent tillage on which spring grains may be disced in, at a saving of time and labor during the busy spring season.

Some of the advantages offered corn under Montana conditions may be summarized as follows:

(1) Permits greater and more profitable diversification of livestock.
(2) Corn is thrifty user of water and resists drouth.
(3) Good substitute for summer fallow in making seed bed for small grain crops, with one advantage over summer fallow in that there is no total loss of labor in cultivation, and land is kept in use.
(4) Corn provides a cheap and fairly sure supply of roughage for feed.
(5) Corn from a large crop can be stored or siloed against the needs of a year when the crop is short.

That corn is not a stranger, nor a newcomer, among the crops of the Northwestern farm is evidenced from the fact that the Indians long before the coming of the white man were raising corn in Missouri River bottoms of North Dakota. The corn plant, itself a native originally of the warm regions far south of its present northern limits, was evidently brought north by the Indians, and much of the work of the white man in plant breeding in late years has been shortened by the earlier work of the Indian in gradually adapting the corn plant to the shorter growing seasons and cooler nights of northern states.

The history of corn in Montana dates back practically to the beginning of wheat production. In 1882 little less than 500 acres of corn were estimated as the total in the State, and by 1892 only about a thousand acres were recorded. Comparatively little development was made prior to 1910, but between 1910 and 1915 a rapid upward trend became noticeable. The rate of increase subsequent to 1915 has been very pronounced, and if maintained would place the crop at the end of the next decade in almost as important a position as wheat.

The reason for the early slow development of corn acreage contrasted with the great expansion of late years lies in the types of farming of the early and middle period of Montana farm history. During this period the extensive cattle raising of the range days was slowly giving ground to the grain farmer, who in the richness of Montana soil found large profits in producing wheat together with the prospect of enhanced land values. There was little inducement to practice the farm programs which the new settlers left in the older agricultural regions where a large investment in the land required a more diversified crop rotation, farm livestock and much more labor. Wheat or cattle ranching on large units of cheap lands with low production cost, and cash markets for each year's out-turn, held out such rewards, barring climatic hazards, that the new settler readily adopted the one-crop idea which in favorable years gave large returns for a few months' work.

Corn had but little place in such a cropping system and naturally did not begin to fill its real place on the Montana farm until the type of farming began to change over on to a more permanent kind. This period may be said to have begun with the big settlement movement that started about 1900, although it was well along toward the end of the second decade before corn began to find its real stride.

UTILIZATION OF MONTANA'S CORN ACREAGE

Corn has been successfully grown in all sections of Montana, except the high altitudes where August frosts prevail. Practically the whole eastern third of the State to the Canadian border shows a fairly dense distribution of the crop with extensions westward through the Milk River, Yellowstone and Gallatin Valleys. Corn is grown extensively in central and north central Montana, with some scattered acreage in northwestern Montana, west of the Continental Divide.

Corn varies in its adaption, utilization and extent of acreage with such factors as average rainfall, length of growing season and available heat units. Local variety tests should be conducted and heeded. More attention should be given to the gathering and proper storage of home grown seed corn of adapted varieties. The dependability and high yielding ability of the early Flint crops, like Gehu, and Dakota White Flint, should be capitalized through more extensive "hogging" and "stocking-off." Listing of corn means cheaper and more extensive methods of production which are essential if corn is to be grown as one of the major crops. The tendency to grow late washy corns for fodder or silage should be curbed. The best varieties to grow are those that mature early every year. Inexpensive silos filled with corn make valuable feed reserves. Adapted varieties and methods of utilization are essential for successful corn growing.

The future of corn acreage in the State is very encouraging and there is little doubt but that the present upward trend will continue for some time, although possibly at a somewhat slower rate than the big expansion of recent years. The corn crop of Montana is evidence of the possibilities of the State for general farming, including livestock and dairy production.

Corn is particularly well adapted to the non-irrigated farms of southeastern Montana and should constitute one of the major feed crops. In 1927 Richland county led the state in corn production with a crop valued at $388,800. Other leading counties were Rosebud, Yellowstone, Dawson and Roosevelt. The average acre yield in 1927 was 23.5 bushels, as compared to 11.0 in 1926 and 16.5 in 1925.

CORN BY YEARS FOR MONTANA
(1882-1927)

Year	Acreage	Yield Per Acre (bushels)	Production (bushels)	Farm Price Per Bushel Dec. 1	Total Farm Value Dec. 1
1882	492	36.6	18,000	$1.05	$ 18,900
1883	502	20.0	10,040	.90	9,036
1884	830	24.9	20,700	.75	15,525
1885	880	25.0	22,000	.80	17,600
1886	890	24.7	22,000	.65	14,300
1887	908	27.5	25,000	.60	15,000
1888	.....	.....	.....	.....	.....
1889	.....	.....	.....	.....	.....
1890	.....	.....	.....	.....	.....
1891	.....	.....	.....	.....	.....
1892	1,080	19.4	21,000	.68	14,364
1893	1,102	27.5	30,305	.70	21,214
1894	1,157	32.7	37,834	.82	31,024
1895	1,331	25.0	33,275	.75	24,956
1896	1,331	26.0	34,606	.60	20,764
1897	1,065	18.0	19,170	.65	12,460
1898	1,598	28.0	44,744	.66	29,531
1899	1,582	23.0	36,386	.52	18,921
1900	1,598	15.0	23,970	.59	14,142
1901	3,095	25.0	77,375	.90	69,638
1902	3,714	22.0	81,708	.72	58,830
1903	3,788	24.1	91,291	.62	56,600
1904	3,902	22.2	86,624	.68	58,904
1905	3,941	19.4	76,455	.68	51,989
1906	3,980	23.4	93,132	.65	60,536
1907	4,000	22.5	90,000	.68	61,000
1908	4,000	23.4	94,000	.90	85,000
1909	10,000	28.8	274,000	.86	236,000
1910	16,000	23.0	368,000	.95	350,000
1911	20,000	26.5	530,000	.80	424,000
1912	24,000	25.5	612,000	.70	428,000
1913	28,000	31.5	882,000	.77	679,000
1914	50,000	28.0	1,400,000	.76	1,064,000
1915	70,000	28.0	1,960,000	.69	1,352,000
1916	74,000	25.0	1,850,000	.93	1,720,000
1917	81,000	12.5	1,012,000	1.75	1,771,000
1918	100,000	21.0	2,100,000	1.35	2,835,000
1919	133,000	4.0	532,000	1.65	879,000
1920	184,000	12.1	2,226,000	.80	1,789,000
1921	190,000	20.1	3,800,000	.67	2,546,000
1922	228,000	24.3	5,540,000	.53	2,936,000
1923	365,000	26.0	9,490,000	.65	6,168,000
1924	420,000	18.0	7,560,000	.99	7,484,000
1925	399,000	16.5	6,584,000	.95	6,255,000
1926	359,000	11.0	3,949,000	.92	3,633,000
1927	305,000	23.5	7,168,000	.72	5,161,000

Compiled by United States Division of Crop and Livestock Estimates, cooperating with the State Department of Agriculture.

HAY

It is only since 1914 that hay has ceased to be the leading crop of the state, both in acreage and in total value. Since 1914 wheat has been the most important crop and in 1917 exceeded hay in value by $46,000,000. The acreage of tame hay has increased with the expansion of irrigated lands, and the more modern methods of cultivating non-irrigated areas, while wild hay acreage has remained quite constant, variations in production being dependent upon rainfall.

Hay is produced chiefly for feed within the state and very little is shipped out. In 1927, 3,701,000 tons of hay were produced on 2,139,000 acres, the average acre yield being 1.73 tons.

Alfalfa shows a production of 1,775,000 tons for 1927, compared to 1,268,000 tons for 1926; the 1927 acreage being 710,000 and the 1926 acreage 650,000.

Acreage seeded to clover, timothy and alfalfa show an increase, while production in each case shows an even greater proportionate increase. For clover and timothy the acreage harvested in 1927 is given at 154,000 acres. as compared with 140,000 acres in 1926. The production for 1927 is 300,000 tons compared with 207,000 tons for 1926.

Approximately half of the tame hay acreage is alfalfa, the remainder being in hay grains, timothy, clover, millets and a few others. The bulk of the acreage devoted to tame hay is found in the irrigated sections.

Wild hay grows in most sections of the state. In some places wild hay is an important crop, where it is produced in connection with the livestock industry. The wild hay of Montana is largely native blue-joint, and is noted for its high nutritive value. Stock readily takes on fat when fed this wild hay alone, while it supplies the proper nutrients for growth of young animals.

Alfalfa is the leading forage crop under irrigation and, under non-irrigated conditions, where moisture conditions above the average are assured, this crop has little competition.

Sweet clover fits into the non-irrigated scheme. The limiting factors are difficulty in obtaining a stand and in handling the crop for quality hay. Sweet clover usually should be planted on summer tilled or corn land which provides the firm and moist seed bed required. It should be harvested just before blossoming. Sweet clover is the leading pasture crop, giving unusual carrying capacity.

Annual hay crops are important in a region where the feed supply is likely to be erratic and where emergency supplies must be produced on short notice. Oats out-yield other small grains, but barley and wheat rank high and are usually preferred from the feeding standpoint. Grain hays should be harvested in the dough stage. Millets can compare only on the basis of cash crops. Sudan grass requires warm weather and its use is limited to a few favored localities.

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THE MONTANA STATE FLOWER

The flower known as Lewisia Rediviva (Bitter Root) shall be the floral emblem of the state of Montana. (Legislative enactment.)

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Montana produced in 1927 about eighty million bushels of wheat, almost 10 per cent of the nation's production. Montana wheat leads all states in protein content and in percentage grading number one under the standards of the United States Department of Agriculture. (See chapter on wheat farming.)

Upper: One of Montana's many hundreds of superb mountain lakes. The lake shown is located within an hour and a half driving distance from Butte, the world's greatest mining camp.
Lower: In the orchard district of the famous Bitter Root valley, Western Montana.

A Gem in the Spanish Peak Country, in Gallatin County

/heat leads all states in protein content and in percentage

Under irrigation the pasture problem is solved by sweet clover and approved grass mixtures. Under non-irrigated conditions sweet clover and small grains are used successfully.

Except for scattered forests in the southern part of Montana and the denser forests which comprise practically all of the western part of the state, the native vegetation is classed as short grass. In this class are found blue gama grass, western wheat grass and needle grass. The bunch grass area in the west central and west southern sections includes wheat grass, sod grass and bunch grass.

Montana is comparatively a new state and up to 1908, its productive agricultural resources were given over primarily to range live stock. Thus hay was the principal crop, both wild and tame hay being harvested for winter feeding. The homesteading and non-irrigated land development started about 1906 and since that time marked increases are noted in the production of cereal and cutivated crops, thus curtailing the production of tame hay.

The tendency of recent years has been to accumulate some surplus of hay to offset fluctuating seasonal production and thus avoid such a situation as occurred in 1919 when an unusually dry season followed by a severe winter brought about serious shortages. At this time it was necessary to ship in hay from nearby states and stockmen were compelled to pay as high as $60 a ton for hay that ordinarily would sell at from $8 to $12 per ton.

Acreage devoted to tame hay in 1927 was decreased from the previous year, due to the fact that more grain was harvested and less cut for hay. A higher acre yield than for years, however, is accountable for the largest tame hay crop in the records of the state. The total crop of wild hay was also larger than ever before, due to greater increased acreage and high yields.

Fergus county led the state with a hay crop valued at $1,243,200. Other counties in order of importance are Gallatin, Cascade, Carbon, Park, Ravalli, Yellowstone, Beaverhead, Lewis and Clark, Powell and Madison.

TAME HAY BY YEARS
(1882-1927)

Year	Acreage	Yield Per (tons)	Production (tons)	Farm Price Per Ton Dec. 1	Total Farm Value Dec. 1
1882	87,000	1.07	93,000	$10.00	$ 930,000
1883	92,220	1.20	110,664	10.50	1,161,972
1884	150,000	1.00	150,000	13.00	1,950,000
1885	142,500	1.10	156,750	10.37	1,625,498
1886	139,650	1.09	152,048	10.50	1,596,504
1887	181,545	1.30	236,009	13.50	3,186,122
1888	181,545	1.20	217,854	8.30	1,808,188
1889	300,033	.90	268,689	11.50	3,089,924
1890	299,802	1.20	359,762	10.50	3,777,501
1891	299,802	1.15	344,772	8.50	2,930,562
1892	320,788	1.10	352,867	8.95	3,158,160
1893	349,659	1.26	440,570	7.89	3,476,097
1894	370,039	1.20	444,707	7.17	3,188,979
1895	311,337	.94	292,657	11.40	3,336,290
1896	345,584	1.38	476,906	6.86	3,271,575
1897	328,305	1.50	492,458	7.75	3,816,550
1898	348,003	1.45	504,604	6.80	3,431,307
1899	361,923	1.42	513,931	7.70	3,957,269
1900	369,161	1.60	590,658	8.70	5,138,725
1901	285,096	1.79	510,322	8.18	4,174,434
1902	313,606	1.68	526,858	7.54	3,972,509
1903	335,558	2.08	697,961	8.81	6,149,036
1904	348,980	1.92	670,042	8.70	5,829,365
1905	362,939	1.60	580,702	7.70	4,471,405
1906	373,827	1.85	691,580	8.90	6,155,062
1907	500,000	1.70	850,000	9.50	8,075,000
1908	525,000	2.00	1,050,000	8.35	8,768,000
1909	549,000	2.00	1,100,000	10.00	11,000,000
1910	615,000*	1.40	861,000	12.50	10,762,000
1911	675,000*	2.00	1,350,000	10.00	13,500,000
1912	715,000*	1.90	1,358,000	8.30	11,171,000
1913	780,000*	1.80	1,384,000	9.60	13,286,000
1914	830,000*	2.50	2,075,000	8.70	18,053,000
1915	900,000*	2.00	1,800,000	7.50	13,500,000
1916	980,000*	1.70	1,666,000	11.00	18,326,000
1917	1,050,000*	1.40	1,470,000	18.60	27,342,000
1918	1,120,000*	1.60	1,792,000	19.60	35,123,000
1919	1,158,000	1.00	1,158,000	23.00	26,634,000
1920	1,105,000	1.80	1,989,000	12.00	23,868,000
1921	1,045,000	1.80	1,881,000	8.70	16,365,000
1922	1,045,000	1.89	1,975,000	9.00	17,775,000
1923	1,150,000	1.88	2,162,000	8.90	19,242,000
1924	1,206,000	1.74	2,102,000	10.00	21,020,000
1925	1,232,000	1.66	2,046,000	10.00	20,460,000
1926	1,309,000	1.58	2,063,000	10.50	21,661,000
1927	1,274,000	2.12	2,706,000	8.40	22,730,000

* Tentative Revisions.

Compiled by United States Division of Crop and Livestock Estimates, cooperating with the State Department of Agriculture.

WILD HAY BY YEARS FOR MONTANA
(1909-1927)

Year	Acreage	Yield Per Acre (Tons)	Production	Farm Price Per Ton Dec. 1	Total Farm Value Dec. 1
1909	585,000	1.01	590,000	*	.....
1910	585,000	.80	486,000	*	.....
1911	585,000	1.10	644,000	*	.....
1912	673,000	1.00	673,000	*	.....
1913	612,000	.95	581,000	*	.....
1914	630,600	.94	592,000	8.70	5,150,000
1915	640,000	1.10	704,000	8.20	5,773,000
1916	646,000	.90	581,000	11.80	6,856,000
1917	536,000	.75	402,000	17.50	7,035,000
1918	482,000	.75	362,000	16.50	5,973,000
1919	451,000	.35	158,000	22.50	3,550,000
1920	652,000	.95	619,000	9.00	5,572,000
1921	657,000	.80	526,000	8.60	4,524,000
1922	660,000	.90	594,000	8.00	4,752,000
1923	653,000	.91	594,000	8.00	4,752,000
1924	673,000	.90	606,000	9.00	5,454,000
1925	650,000	.90	585,000	9.00	5,265,000
1926	393,000	.80	314,000	9.50	2,983,000
1927	865,000	1.15	995,000	7.50	7,462,000

* No data available.

Compiled by United States Division of Crop and Livestock Estimates, cooperating with the State Department of Agriculture.

OATS.

Oats primarily is grown as a farm feed in Montana, although a varying percentage usually less than 20 per cent is sold, depending largely upon market prices. Acreage of oats ranks about third among Montana crops, being exceeded by wheat and hay. Considering its total value including that of farm feed, it also ranks about third in annual crop values.

In acreage the crop showed a fairly steady increase up to 1919, since that time the acreage has fluctuated from year to year, between 550,000 and 650,000 acres.

The crop has about the same range of distribution as spring wheat, if anything slightly exceeding that crop in adaptability to varying Montana conditions. It is in the irrigated acreages of the northeast, east, and central parts of the State that the densest oats acreage occurs.

The leading varieties grown in the States are Swedish Select, Victory, and Sixty Day, all of which yield well, and in some seasons under irrigation very high acre yields are secured. Montana oats test usually well above the standard bushel weight and in this respect are above the average of the entire United States, with no other state equalling Montana except Wyoming. Over a period of ten years Montana oats have an average weight per bushel of 36.5 pounds compared with the average of all United States of 32.0 pounds, the standard weight per bushel.

The 1927 oats crop was the third largest in the history of the state, the total production being 23,840,000 bushels valued at $10,490,000.

The average yield in 1927 was the highest in 12 years. Only four states had oats yields per acre which equalled or exceeded Montana's yield.

In 1927 Sheridan county led the state with an oats crop valued at $618,640. Other leading counties were Daniels, Valley, Phillips and Fergus.

The moderate decrease in oats acreage in 1927 was due to the late spring and the shift from oats to barley for feed purposes that has developed during the past few years in some sections of the state. The average acre yield in 1927 was 40 bushels, compared with 26 bushels in 1926 and 22.5 bushels in 1925.

CENTRAL MONTANA FARM HOME

OATS BY YEARS IN MONTANA
(1882-1927)

Year	Acreage	Yield Per Acre (bushels)	Production (bushels)	Farm Price Per Ton Dec. 1	Total Farm Value Dec. 1
1882	28,000	39.3	1,100,000	$ .75	$ 825,000
1883	32,200	37.6	1,210,000	.58	701,800
1884	52,000	33.5	1,740,000	.35	609,000
1885	53,560	33.1	1,775,000	.42	745,500
1886	56,774	35.0	1,987,000	.55	1,092,850
1887	60,180	31.0	1,866,000	.45	839,700
1888	61,384	29.0	1,780,000	.34	605,200
1889	85,938	30.0	2,578,000	.44	1,134,382
1890	90,235	31.0	2,797,000	.59	1,650,398
1891	94,747	32.0	3,648,000	.48	1,750,925
1892	66,323	28.8	1,910,000	.40	764,041
1893	66,986	34.0	2,277,524	.37	842,684
1894	66,986	40.1	2,686,139	.31	832,703
1895	68,326	35.8	2,446,071	.44	1,076,271
1896	64,910	40.7	3,050,770	.31	945,739
1897	61,664	42.0	2,589,888	.33	854,663
1898	61,047	40.6	2,478,508	.35	867,478
1899	60,986	38.0	2,317,468	.39	903,813
1900	65,865	39.0	2,568,735	.42	1,078,869
1901	147,365	42.0	6,189,330	.36	2,228,159
1902	159,154	41.9	6,668,553	.36	2,400,679
1903	162,337	46.4	7,532,437	.35	2,636,353
1904	167,207	37.7	6,303,704	.46	2,899,704
1905	178,911	41.3	7,389,024	.43	3,177,280
1906	196,802	43.2	8,501,846	.44	3,740,812
1907	240,000	49.0	11,760,000	.46	5,410,000
1908	254,000	41.6	10,566,000	.49	5,177,000
1909	333,000	41.4	13,806,000	.42	5,798,000
1910	390,000	38.0	14,820,000	.46	6,817,000
1911	425,000	49.8	21,165,000	.40	8,466,000
1912	476,000	48.0	22,848,000	.35	7,997,000
1913	500,000	43.5	21,750,000	.32	6,960,000
1914	530,000	35.0	18,550,000	.39	7,234,000
1915	600,000	52.0	31,200,000	.32	9,894,000
1916	660,000	38.0	25,080,000	.47	11,788,000
1917	680,000	20.0	13,600,000	.81	11,016,000
1918	680,000	30.0	20,400,000	.80	16,320,000
1919	579,000	6.0	3,474,000	.91	3,161,000
1920	533,000	22.0	11,726,000	.51	5,980,000
1921	618,000	24.0	14,832,000	.34	5,043,000
1922	660,000	32.0	21,120,000	.37	7,814,000
1923	673,000	33.0	22,209,000	.38	8,439,000
1924	570,000	29.5	16,815,000	.47	7,903,000
1925	605,000	22.5	13,612,000	.53	7,214,000
1926	641,000	26.0	16,666,000	.53	8,833,000
1927	596,000	40.0	23,840,000	.44	10,490,000

Compiled by United States Division of Crop and Livestock Estimates, cooperating with the State Department of Agriculture.

RYE

In 1927 the acreage sown to rye totaled 134,000 and the production of 2,412,000 bushels was the second largest crop in the history of the state, giving Montana fourth place in the United States. The value of the 1927 crop was $1,761,000 as compared with $963,000 in 1926.

Both winter and spring sown rye are grown in Montana, the fall sown rye making up the bulk of the total. Estimates of rye acreage exclude that cut for hay. The practice of cutting rye for hay is general in some of the drier sections of the State where grass growth is short. As a grain, rye is utilized both as a feed crop and as a marketable cash crop, and in the latter usage acreage is influenced to some extent by trends of market prices.

The northern counties lead in production of rye grain, although considerable acreage is grown in central Montana for both grain and hay, and there is a relatively good distribution of acreage over most of the State.

The hardiness of rye and its adaptability to dry land sections make it a very suitable crop for Montana farms and in some sections is proving a good substitute for wheat where that crop fails to winter through.

Winter rye has a place in areas where winter wheat is not a leading crop. Its volunteering tendencies are objectionable. Montana winter rye is a good hog feed, and can be produced at low cost. The crop is grown in nearly all parts of the state, but the bulk of the acreage is located in the north central and northeastern parts of the state.

In 1927 Blaine county led the state with a rye crop valued at $235,936. Other leading counties were Phillips, Sheridan, Roosevelt and Chouteau. The average yield per acre in 1927 was 18 bushels, as compared to 12 bushels in 1926 and 12.5 bushels in 1925.

RYE BY YEARS FOR MONTANA
(1901-1927)

Year	Acreage	Yield Per Acre (bushels)	Production (bushels)	Farm Price Per Bushel Dec. 1	Total Farm Value Dec. 1
1901	1,834	26.7	48,968	$ .60	$ 29,381
1902	1,871	25.0	46,775	.64	29,936
1903	1,899	24.6	46,494	.63	29,291
1904	1,871	19.9	37,233	.77	28,669
1905	1,871	20.0	37,420	.65	24,323
1906	2,021	20.5	41,430	.66	27,344
1907	2,100	22.0	47,900	.68	32,000
1908	2,000	20.0	40,000	.68	27,000
1909	6,000	18.4	111,000	.75	83,000
1910	6,000	20.0	120,000	.68	82,000
1911	8 000	23.0	184,000	.72	132,000
1912	10,000	23.5	235,000	.60	141,000
1913	13,000	19.0	247,000	.55	136,000
1914	16,900	20.0	320,000	.70	224,000
1915	21,000	22.5	472,000	.65	307,000
1916	30,000	20.5	615,000	.96	590,000
1917	29,000	12.7	368,000	1.65	607,000
1918	54,000	12.0	648,000	1.44	633,000
1919	76,000	3.0	228,000	1.85	422,000
1920	59,000	8.0	472,000	1.08	510,000
1921	116,000	11.2	1,299,000	.53	688,000
1922	240,000	14.0	3,360,000	.54	1,814,000
1923	156,000	11.0	1,716,000	.51	875,000
1924	80,000	14.0	1,120,000	.91	1,019,000
1925	80,000	12.5	1,000,000	.74	740,000
1926	107,000	12.0	1,284,000	.75	963,000
1927	134,000	18.0	2,412,000	.73	1,761,000

Compiled by United States Division of Crop and Livestock Estimates, cooperating with the State Department of Agriculture.

BARLEY.

Montana ranked tenth in the United States in the production of barley in 1927. While the acreage increased only 40,000, from 156,000 acres in 1926 to 195,000 acres in 1927, the production doubled during this period. The last crop harvested totaling 6,435,000 bushels was valued at $3,861,000.

While having a wide range of adaptability as well as an extensive distribution, barley acreage in Montana has never averaged much more than a fifth of the acreage devoted to oats. Like its companion crop, oats, it is grown largely as a farm feed, although in certain sections of the non-irrigated districts barley of good quality can be grown, especially in years when moisture conditions are favorable for the production of a good, plump berry. The dry weather gives good conditions under which to harvest the crop retaining both quality and color.

Barley has the advantage of requiring on an average a somewhat shorter growing season than either oats or wheat and is exposed, therefore, for a shorter time to the unfavorable climatic conditions that occasionally reduce the yields of the other grains.

In weight per measured bushel Montana barley also ranks high, the five-year average being 49.0 pounds for Montana compared with 45.9 pounds for the United States.

In many sections of the state barley will produce more pounds of actual feed per acre than oats, if due attention is given to seed bed, proper variety and fairly early seeding. It does especially well in the higher altitudes.

Barley is becoming a feed crop on Montana farms, and evidences, by increase in acreage in nearly all counties, a steady growth. Gallatin county led in barley acreage in 1927, followed by Fergus, Flathead, Park and Pondera. In some sections, particularly the Gallatin valley, a part of the crop is shipped to markets.

The average yield per acre in 1927 was 33 bushels, as compared to 24 bushels in 1926 and 21 bushels in 1925.

BARLEY BY YEARS FOR MONTANA
(1882-1927)

Year	Acreage	Yield Per Acre (bushels)	Production (bushels)	Farm Price Per Bushel	Total Farm Value Dec. 1
1882	1,852	29.1	53,959	$1.00	$ 53,959
1883	1,945	25.8	50,182	.73	36,663
1884	2,139	34.6	74,000	.60	44,400
1885	2,353	30.2	71,000	.77	54,354
1886	3,144	22.9	72,000	.46	33,120
1887	3,458	22.6	78,000	.56	43,680
1888	3,804	28.7	109,000	.65	70,964
1889	4,652	34.6	160,000	.60	96,541
1890	4,792	24.0	115,008	.74	85,106
1891	4,792	30.0	143,760	.65	93,444
1892	5,032	32.5	163,540	.66	107,936
1893	5,183	30.1	156,008	.50	78,004
1894	5,183	22.5	116,618	.40	46,647
1895	5,701	25.0	142,525	.59	84 090
1896	5,701	25.0	142,525	.55	78,389
1897	5,188	38.0	197,144	.50	98.572
1898	5,240	36.0	188,640	.57	107,525
1899	6,183	35.0	216,405	.51	110,367
1900	5,194	38.8	201,527	.48	96,733
1901	16,398	39.0	639,522	.57	364,528
1902	17,874	37.0	661,338	.51	337,282
1903	18,231	40.2	732,886	.58	425,074
1904	17,502	29.9	523,310	.62	324,452
1905	15,227	33.0	502,491	.56	281,395
1906	14,313	33.0	472,329	.56	264,504
1907	17,000	38.0	646,000	.62	400,000
1908	25,000	35.0	875,000	.61	534,000
1909	27,000	27.7	753,000	.63	474,000
1910	30,000	28.0	840,000	.62	521,000
1911	31,000	34.5	1,070,000	.68	728,000
1912	39,000	36.5	1,424,000	.53	755,000
1913	60,000	31.0	1,860,000	.48	893,000
1914	70,000	30.5	2,135,000	.53	1,132,000
1915	80,000	34.0	2,720,000	.48	1,306,000
1916	95,000	28.0	2,660,000	.76	2,022,000
1917	90,000	15.0	1,350,000	1.03	1,390.000
1918	87,000	22.0	1,914,000	1,00	1,914,000
1919	75,000	5.6	420,000	1.40	588,000
1920	64,000	18.0	1,152,000	.65	749,000
1921	75,000	20.5	1,538,000	.60	923,000
1922	92,000	25.0	2,300,000	.50	1,150,000
1923	105,000	25.5	2,678,000	.48	1,285,000
1924	104,000	25.0	2,600,000	.69	1,794,000
1925	156,000	21.0	3,276,000	.72	2,359,000
1926	150,000	24.0	3,600,000	.64	2,304,000
1927	195,000	33.0	6,435,000	.60	3,861,000

Compiled by the United States Division of Crop and Livestock Estimates, cooperating with the State Department of Agriculture.

BEANS.

The field bean is rapidly assuming an important place as one of the supplementary cash crops under irrigated and non-irrigated conditions. Bean production in Montana in 1927 more than doubled that of 1926. The total acreage last year was 55,000 as compared to 4,000 acres in 1922.

Ninety per cent of the beans grown are the Great Northern variety, a dry white bean of excellent eating quality, which was developed from a native Indian-grown bean from the Upper Missouri Valley. The average yield under irrigation is about 20 bushels, and non-irrigated land will produce about 10 bushels per acre. Yields as high as 50 bushels on irrigated and 15 to 20 bushels on non-irrigated lands, have been reported. The non-irrigated bean acreage is slowly increasing.

Great Northern variety produces a high quality bean with small dockage. Idaho is the principal competitor of Montana in this crop. In the growing of beans, the quality is affected by weather conditions, too much rain causing discoloration and frosts causing splits and other damage. This particular type of bean is grown almost exclusively for sale.

Field beans are a profitable crop. They clean the land, and fit admirably into a rotation system, where the conditions are favorable for their production.

Commercial production of the Great Northern bean in Montana is chiefly centered in Yellowstone county and in counties adjoining. Montana ranked sixth in the production of dry beans in 1926 and 1927. Yellowstone county led the state in total production in 1927, other leading counties being Big Horn, Rosebud, Carbon and Richland.

Other varieties of beans grown in Montana include a small amount of chili beans, and colored beans, in dried beans, and a small but growing production of green beans for canning. In 1927 there were almost 30,000 cases packed as compared to 22,095 cases in 1926. worth $50,238.

The total production of all beans in 1927 was 935,000 bushels, valued at $2,805,000. The average yield was 17 bushels—which was surpassed by only two other states—as compared to 10 bushels in 1926 and 12.5 bushels in 1925.

FLAX.

Flax, an important cash crop in the eastern and northeastern counties of Montana, reached its high peak in acreage during 1910 and maintained a steady increase for the succeeding ten years. This is due to the fact that flax is the most popular crop for newly broken sod land and will on an average yield 10.6 bushels per acre, the first years. When planted on alfalfa ground, the yields will increase to 22 bushels per acre. Clean seed planted on clean, well prepared ground are the important factors in the production of high quality flax.

It is conceded that the rate of seeding flax is not as important a factor as germination and purity of seed. The average rate of seeding is approximately 18 pounds of seed per acre.

Although originally grown only on the plowed sod of new land, due to the risk of flax-wilt on old lands, flax, through the development of wilt-resistant strains and in long rotation systems, is now grown extensively on old lands, thus finding a permanent place among the state's crops. Flax seed grown in Montana is rated very highly on the markets and often commands top prices.

Last year was particularly favorable for flax, the average acre yield being 10.2 bushels, as compared to 4.7 bushels in 1926 and 4.5 bushels in 1925. Figures on production therefore, cannot be taken as representative of other years, but they do indicate the relative merits of different production methods. A grower in Prairie county sowed nine pounds of seed per acre and received a yield of 16.5 bushels per acre from a 150-acre field. A grower in Blaine county sowed 22 pounds of seed per acre in a field of 110 acres and received a yield of 22 bushels per acre. These are extreme variations in the rate of planting which indicate the importance of using good seed.

In 1927, 93 per cent of the flax reported by growers to the agronomy department

SWEET PEAS GROWN FOR SEED

of the Montana State College, was grown on newly broken sod land and averaged 10.6 bushels per acre.

Average flax yields for different counties for the last six years are as follows: Blaine, 7.8 bushels; Daniels 7.7 bushels; Roosevelt, 7 bushels; Sheridan 8.2 bushels; Valley, 7.4 bushels; Dawson, 7.4 bushels; Garfield 7.2 bushels; McCone, 6.9 bushels; Richland, 7.1 bushels; and Wibaux, 7.4 bushels. The average acre yield for 1927 was 10.2 bushels. The total crop was 2,438,000 bushels, harvested from 239,000 acres and was valued at $4,266,000.

Practically all of the production, except that saved for seed, is shipped to markets outside the state.

Flax seed crushers state that Montana seed produces more oil per bushel than seed grown further east or south. The dockage on Montana flax seed is considerably lower than on seed from North and South Dakota, and Minnesota.

Market conditions, prices and average yields favor an increase in flax production. A weed-free and firm seed bed is essential. It is important to avoid weed infested flax seed. For irrigated conditions, the flax and wheat mixture plan is promising and the results of the present extensive demonstration campaign by the Montana Extension Service, should be observed.

FLAX BY YEARS FOR MONTANA
(1902-1927)

Year	Acreage	Yield Per Acre (bushels)	Production (bushels)	Farm Price Per Bushel Dec. 1	Total Farm Value Dec. 1
1902	12,500	9.0	112,500	$ .68	$ 76,500
1903	12,625	14.0	176,750	.60	106,050
1904	9,334	8.0	74,672	.95	70,938
1905	16,570	10.0	165,700	.82	135,874
1906	24,855	12.0	298,260	1.00	298,260
1907	34,000	13.0	436,000	.81	353,000
1908	9,000	11.5	104,000	1.00	104,000
1909	38,000	11.9	447,000	1.60	715,000
1910	300,000	7.0	2,100,000	2.40	5,040,000
1911	425,000	7.7	3,272,000	1.80	5,890,000
1912	460,000	12.0	5,520,000	1.12	6,182,000
1913	400,000	9.0	3,600,000	1.15	4,140,000
1914	300,000	8.0	2,400,000	1.20	2,880,000
1915	250,000	10.5	2,625,000	1.70	4,462,000
1916	325,000	9.5	3,088,000	2.48	7,658,000
1917	583,000	3.0	1,749,000	2.95	5,160,000
1918	547,000	3.0	1,641,000	3.38	5,547,000
1919	370,000	1.3	481,000	4.40	2,116,000
1920	407,000	2.6	1,058,000	1.75	1,851,000
1921	110,000	5.0	550,000	1.40	770,000
1922	84,000	7.2	605,000	1.97	1,192,000
1923	110,000	8.2	902,000	1.93	1,741,000
1924	246,000	8.7	2,140,000	2.21	4,729,000
1925	244,000	4.5	1,098,000	2.20	2,416,000
1926	165,000	4.2	693,000	1.85	1,282,000
1927	239,000	10.2	2,438,000	1.75	4,266,000

Compiled by United States Division of Crop and Livestock Estimates, cooperating with the State Department of Agriculture.

ALFALFA, SWEET CLOVER AND OTHER SEED CROPS

ALFALFA SEED

At the 1927 International Grain and Hay Show, Montana won the Reserve Championship in alfalfa seed and also second place, thereby demonstrating the superiority of the seed grown in this state.

In tests conducted by the Michigan Agricultural College Experiment Station, it was found that Montana common alfalfa seed is superior to that produced in Idaho and Utah. In the comparative tests conducted there during the past six years Montana common seed has averaged 4.52 tons of hay per acre as compared with 3.98 tons for seed from Utah and 3.70 tons for seed from Idaho.

In 1923, an exceptionally favorable hay year, the yield from Montana seed was 7.36 tons, Utah 6.92 tons and Idaho 6.51 tons. In every year but one since 1922 Montana seed has proved superior. In 1922 the tests showed very little difference with Montana seed yielding 5.11 tons, Utah seed 5.15 tons and Idaho 4.91 tons.

There is a strong out-of-the state demand for registered Grimm alfalfa, the market price being approximately double that paid for common varieties. The distinct advantage of producing alfalfa seed is the relatively low bulk and high value.

Southeastern Montana counties are the largest producers of registered alfalfa seed, but it is also grown in northeastern counties along the Milk River and in localities west of the Continental Divide. The leading counties in 1927 were Custer, Powder River, Rosebud and Treasure.

Approximately one-half of the alfalfa seed grown in Montana is certified seed. The state department of agriculture "tags" and seals cars of Montana alfalfa seed certifying origin of the seed. During recent years an average of about 3,000,000 pounds have been sealed.

The alfalfa seed crop was spotted in 1927, due chiefly to unfavorable weather in local areas over the whole alfalfa seed section at the season when the seed was forming and developing.

The total acreage in 1927 was less than half of that harvested in 1926, being only 11,000 acres with a total production of 20,000 bushels of seed, which is valued at $13 per bushel. The 1926 crop of 62,000 bushels was harvested from 23,000 acres.

CLOVER SEED

Montana's soil and climate conditions are conducive to quality seed production. Alfalfa not being a dependable crop in dry seasons, sweet clover is most important as a legume and pasture crop. The bulk of the sweet clover crop is produced in southeastern Montana, although it has a quite general distribution over the state. Sweet Clover is recommended in non-irrigated sections. In western Montana the possibilities for red clover are encouraging and should be investigated.

Sweet clover fits into the non-irrigated farm scheme. The limiting factors are difficulty in obtaining a stand and in handling the crop for quality hay. Sweet clover usually should be planted on summer tilled or corn land which provides the firm and moist seed bed required. It should be harvested just before blossoming. Sweet clover is the leading pasture crop, giving unusual carrying capacity.

Other side-line cash crops are timothy seed, sunflowers for silage, and cucumber seed. An opportunity exists for enlarging the present activities for the production and marketing of small grain seed in carload lots.

In 1927, 5000 acres devoted to clover seed produced 25,000 bushels valued at $15 per bushel. The leading counties are Cascade, Fergus, Stillwater and Yellowstone.

REGISTRATION OF SEED

All growers of registered grain and alfalfa seed must have their applications for inspections in at the office of the Montana Seed Growers' Association, Bozeman, on or before June 1, each year. The prospects are that there will be more pure seed fields and increased acreages, making it more necessary than ever to arrange for field inspections well in advance.

The business of pure seed production has reached very sizeable proportions in Montana. In 1927 there were nearly 1,000 fields that passed inspection and many more were examined by inspectors of the Montana Seed Growers' Association that failed to meet the stringent rules laid down by the organization and the agronomy department of the Montana State College. This represents a development of nine years, in 1919 there being but two fields of registered seed in the state. Phillips and Valley were the first counties in the state to produce certified seed.

ALFALFA AND SWEET CLOVER SEED PRODUCTION

	ALFALFA SEED			SWEET CLOVER SEED		
YEAR	Acreage	Acre Yield (bu.)	Production (bu.)	Acreage	Acre Yield (bu.)	Production (bu.)
1924	19,000	2.5	47,000			
1925	28,000	2.8	78,000			
1926	23,000	2.7	62,000	5,000	5.0	25,000
1927	11,000	1.8	20,000	5,000	5.0	25,000

ONION SETS GROWN FOR SEED
A New Enterprise of the Diversified Farmer in Montana

HORTICULTURE

The Montana McIntosh Apple Tops Eastern Markets—Horticulture Becoming More Firmly Established Every Year.

By EDWARD DICKEY

Horticulture in Montana, though still in its infancy, is becoming every year more firmly established. There is a growing feeling of permanency from year to year among fruit growers of the state who have watched the progress of the industry and can now profit by the mistakes of past years. New plantings are made only with the fruits which have shown their adaptability to Montana soil and climate.

Apples were the first fruit planted in the State and Thomas W. Harris has the credit of planting the first trees. These trees were planted in the year 1866 and were brought into the territory from Walla Walla, Washington, on the backs of mules. The next plantings recorded are those made by Major John Owen near the fort which was given his name in the Bitter Root valley. In 1872, John B. Wright and Henry Buck of Stevensville started a nursery of apple trees. They brought their first 10,000 root grafts from a nursery in Monroe, Michigan. Shipment was made by train to Corrine, Utah, thence overland by Concord Coach to Missoula, and from there by mail carrier to their ranch one mile north of Florence. Later W. E. and D. C. Bass set out an orchard of 4,000 trees near Stevensville, many of their first grafts having been purchased at the new nursery. This orchard was set largely to the Alexander variety with some McIntosh. The first ripe apples were obtained in 1877, and thereafter their crops of apples were boxed in the fall and wagoned out to the various mining camps where they obtained fabulous prices for the fruit. John S. Robertson bought a quantity of the grafts about the same time. R. Parkhurst was another early day orchardist who made a success of fruit raising, in partnership with W. B. Harlan.

R. H. Sutherland of White Sulphur Springs, Daniel E. Bandmann at Missoula, C. C. Willis at Plains, Fred Gilber at Lolo, Fred Whiteside at Kalispell, T. A. Mc-

POTATOES—700 BUSHELS TO THE ACRE

Clain at Carlton, H. C. B. Colville at Missoula, and William Tiedt at Darby were other pioneer orchardists.

In the spring of 1879 Henry Buck and his brother Amos planted an orchard lot to trees shipped in from a New York nursery. In this lot were planted the first McIntosh apple trees in the state.

A fair held in Stevensville in 1893 brought together such a magnificent display of fruits that faith in the fruit growing industry in the Bitter Root valley was established in the minds of the people. A meeting of fruit growers was called after this fair and the Horticultural Society was organized in Stevensville but not incorporated. In February, 1898 the society met at Missoula and incorporated, under the name of the Montana Horticultural Society. The society has done much to aid the industry in the state. It has worked out the best varieties of fruit, the best method of cultivation, irrigation, pruning and system of marketing. It was this organization that developed the high standard of grade and pack for the Montana apple by which it has gained such a high standard in the New York market.

Until about 1915 the main discussion at every meeting of the Montana Horticultural Society, which was organized in Misoula in 1898, was, "What is the best apple to grow in Montana?" The severe cold snap of December, 1924, although it caused winter killing and at least temporary injury to a good many of the trees, proved to be a valuable object lesson to fruit men as it determined definitely the tree best adapted to Montana conditions. Many apple varieties planted prior to that time with fair promise of success were killed outright by the severe cold, but the McIntosh, although injured to an extent that it has taken several seasons to bring it back to its former vigor, came through better than any other variety and is now getting back in good shape from a production standpoint. Since then there has been little thought of any other variety of apple in connection with commercial orcharding.

While the production of McIntosh in Montana in 1927 was light, the general feeling at the opening of the 1928 season is one of optimism. The light crop of the 1927 season permitted the trees to take on fresh vitality in preparation for a fair crop for the season of 1928. The abnormal rainfall throughout western Montana during the fall months of 1927 put reserve moisture into the subsoil which will greatly benefit the 1928 crop.

With a well established market for high quality, well graded and packed McIntosh, growers feel that their orchards should in the future pay them fair returns for the labor and capital invested.

SOUR CHERRIES

The sour cherry industry from the standpoint of financial returns had also proved its value to western Montana. The last two seasons have probably seen more sour cherries planted than all other varieties of tree fruits combined. The quality of the cherries canned at Hamilton and Stevensville has established a reputation with nation-wide trade. Growers can handle McIntosh apple orchards and sour cherry orchards with great efficiency because of the fact that the cherry harvest is finished each season before the apple harvest commences.

A MONTANA STRAWBERRY CREW

Sweet cherries of the Bing and Lambert varieties are grown around Flathead Lake. Each year sees added faith in this crop both on account of its fine quality and the fact that it is practically the last sweet cherry crop to be harvested in the nation. For that reason the crop has little competition on the large consuming markets of the country. New York dealers have expressed the belief that they receive no finer sweet cherries on their market than those of the Bing and Lambert grown on the shores of Flathead Lake.

BERRIES

The progressive everbearing strawberry has been found a desirable crop for Montana fruit growers. Here, likewise, the lateness of the second crop is a factor in increasing the value of shipments. The late picking comes on the market during the months of August and September when there are few berries from other localities.

Red raspberries, blackberries and cherry currants are grown to perfection in favorable localities and while the production is small the crops will without doubt prove valuable for growers in the future.

APPLES BY YEARS FOR MONTANA
(1909-1927)

Year	Total Production (bushels)	Farm Value Per Bushel Dec. 1	Total Farm Value of Crop Dec. 1
1909	567,000	*	*
1910	420,000	$1.20	$ 504,000
1911	900,000	1.15	1,035,000
1912	900,000	1.03	927,000
1913	840,000	1.42	1,192,000
1914	900,000	.76	684,000
1915	1,041,000	.93	968,000
1916	768,000	1.10	845,000
1917	1,044,000	1.00	1,044,000
1918	792,000	2.10	1,663,000
1919	850,000	1.75	1,488,000
1920	825,000	1.80	1,485,000
1921	975,000	1.50	1,465,000
1922	610,000	1.00	610,000
1923	990,000	1.30	1,287,000
1924	290,000	1.29	374,000
1925	80,000	1.75	140,000
1926	325,000	1.20	390,000
1927	277,000	1.30	360,000

* No data available.

Compiled by United States Division of Crop and Livestock Estimates, cooperating with the State Department of Agriculture.

POTATOES

Montana grown certified seed potatoes have gained within the past few years an enviable reputation in southern and western producing centers. A trial shipment made during 1927 to Texas proved the Montana seed the equal or better than other northern grown seed and far superior to southern grown seed giving better stands, thriftier growth and always appearing a month to six weeks in advance of southern seed planted on the same date.

Netted Gem and Bliss Triumph are the leading varieties both for certified seed production and table stock. Netted Gem are grown west of the mountains and Bliss Triumph in the Milk River valley and in the extreme eastern portion of the state around Sidney, Wibaux and Baker.

The irrigated districts of Washington and Idaho which are heavy producers of Netted Gems, recognize the fact that Montana produces seed gems which yield heavy crops. The Kalispell district ships seed annually to the Yakima section and the Helena district to southern Idaho.

Montana soil and climatic conditions are such that insects and diseases are less troublesome than in many potato districts. As a result, Montana growers are able to produce high quality seed potatoes by careful practices.

Montana commercial potatoes have an advantage on the middle western market in that they can be marketed in the spring in practically as firm a condition as when dug in the fall. During April and May the eastern round white potatoes are becoming spongy and soft and the premiums for well graded western Netted Gems increases.

The first five counties in the state in value of the potato crops in 1927 are: Flathead, Ravalli, Gallatin, Lewis and Clark, and Yellowstone.

POTATOES BY YEARS FOR MONTANA
(1882-1927)

Year	Acreage	Yield Per Acre (bushels)	Production (bushels)	Farm Price Per Bushel Dec. 1	Total Farm Value Dec. 1
1882	2,500	120	300,000	$1.00	$ 300,000
1883	2,575	105	270,375	.70	189,263
1884	2,781	105	292,000	.56	162,520
1885	3,198	82	262,000	.50	131,118
1886	4,253	106	451,000	.90	405,900
1887	4,466	110	491,000	.64	314,240
1888	4,600	120	552,000	.50	276,000
1889	4,270	87	371,490	.65	241,468
1890	4,484	73	327,332	.80	261,866
1891	4,708	120	564,960	.41	231,634
1892	4,614	100	461,400	.60	276,840
1893	4,799	138	662,262	.69	456,961
1894	5,183	111	575,313	.48	276,150
1895	5,442	53	288,426	.48	138,444
1896	4,952	170	841,840	.32	269,389
1897	4,506	156	702,936	.40	281,174
1898	4,551	104	473,304	.55	260,317
1899	4,597	141	648,177	.53	343,534
1900	4,781	134	640,654	.53	339,547
1901	9,932	157	1,559,324	.73	1,138,307
1902	11,521	153	1,762,713	.50	881,356
1903	12,904	176	2,271,104	.44	999,286
1904	13,162	143	1,882,166	.61	1,148,121
1905	13,688	120	1,642,560	.59	969,110
1906	14,099	152	2,143,048	.61	1,307,259
1907	18,000	150	2,700,000	.50	1,350,000
1908	20,000	138	2,760,000	.70	1,932,000
1909	21,000	156	3,276,000	.51	1,671,000
1910	22,000	120	2,640,000	.85	2,244,000
1911	25,000	150	3,750,000	.74	2,775,000
1912	30,000	165	4,950,000	.40	1,980,000
1913	33,000	140	4,620,000	.67	3,095,000
1914	33,000	140	4,620,000	.64	2,957,000
1915	36,000	155	5,580,000	.50	2,790,000
1916	37,000	125	4,625,000	1.20	5,550,000
1917	39,000	95	3,705,000	1.02	3,779,000
1918	37,000	135	4,995,000	.80	3,996,000
1919	38,000	60	2,280,000	1.60	3,648,000
1920	40,000	110	4,490,000	1.05	4,620,000
1921	41,000	115	4,715,000	.80	3,772,000
1922	45,000	126	5,670,000	.40	2,268,000
1923	36,000	110	3,960,000	.65	2,574,000
1924	34,000	.88	2,992,000	.87	2,603,000
1925	35,000	108	3,780,000	1.60	6,048,000
1926	35,000	85	2,975,000	1.20	3,570,000
1927	40,000	135	5,400,000	.65	3,510,000

Compiled by United States Division of Crop and Livestock Estimates, cooperating with the State Department of Agriculture.

Many acres of land are still available in western Montana that are well adapted for the growing of apples, cherries, strawberries, raspberries, and all of the cane fruits.

Fruit growing when operated in conjunction with a dairy farm makes the best combination known in the farming industry. The refuse from the cow barn will keep up the fertility of the orchard or garden. Fruit will yield more per acre than any other crop the farmer can grow, and he is able to avoid the annual spring planting.

Our climatic conditions in western Montana are exceptionally adapted to the growing of fruit because the cool nights and warm days have a tendency to put both color on and flavor in the fruit. The same condition is also a wonderful help in the control of all the insect pests and diseases that usually work on fruit. We have no pests or diseases in our orchards today that we cannot control by either spray or cultivation.

The State government has always taken an active interest in the horticulture industry and maintains a Division of Horticulture which is one of the active divisions of the State Department of Agriculture.

This Division maintains an active inspection service which inspects all outgoing shipments of fruit and keeps open the grade and pack so that the purchaser may be assured that the package contains the quality that is stamped thereon.

This is a very valuable service, as it has a tendency to standardize the Montana products and creates a better market. New York buyers have come to demand a state certificate of inspection from this Department on all car load shipments at the time of loading. This method of inspection by a disinterested inspector serves both the fruit grower and the buyer and the certificate protects both buyer and seller.

This Division also assists in active work in controlling and eradicating any outbreaks in insect pests and diseases which may occur in the orchard. It also assists in advising the grower as to the best methods of handling his orchard.

FLOUR AND CEREAL MILLS

Milling is one of the important state industries from the standpoint of agriculture. Montana mills have at their doors the finest milling wheat in the world, and they have expanded rapidly with the increased production of wheat during the past 18 years.

At the beginning of 1928, Montana had 60 flour mills with a daily capacity of 13,500 barrels. During 1927 approximately 2,500,000 barrels of flour were produced, representing the purchase by millers of 11,000,000 bushels of the state's largest wheat crop.

Besides the flour mills, there are several large cereal mills in operation which manufacture rolled oats, wheat flakes, farina, pearl barley, and other cereal products. These mills afford a market for large quantities of oats grown in the state, as well as barley and wheat. The well-filled and heavy-weighing oats grown in the state are particularly adapted for the manufacture of rolled oats.

GRAIN STORAGE

There are about 600 grain elevators with a combined capacity of 18,000,000 bushels.

All elevators are bonded by and under the supervision of the Montana Department of Agriculture, which is vested with broad powers for the protections of the owners of stored grain. The owner of the grain, and not the elevator, has the option of receiving his grain back at the point of first delivery or at a terminal selected by him. The storage of grain is a bailment and not a sale, and the sale of stored grain by an elevator and the use of the proceeds in the business is prohibited.

A farm warehouse storage law has been enacted, under which negotiable warehouse certificates will be issued upon the grain stored on the farm. One of the objects of the law is to give the owner of farm-stored grain a better opportunity to secure an advance on wheat he desires to hold.

SUGAR BEETS

Factories at Billings, Sidney, Chinook, and Missoula—Pioneer Factory at Billings Points Way.

Beet sugar has been an important product of Montana since 1906 when the pioneer refinery was built by the Great Western Sugar company at Billings. Acreage devoted to beets increased year by year and in 1925 two additional factories were built, one at Chinook by the Utah-Idaho Company and the other at Sidney by the Holly Sugar Company. The latest development in the industry is the construction at Missoula of a million dollar refinery completed during the summer of 1928 by the Amalgamated Sugar company, serving beet growers in the western part of the state. Beets for the first three factories are grown on three established irrigation projects, the Huntley, the Milk River and the Lower Yellowstone.

The beet growing industry has expanded to nearly three times the reported acreage shown by the Federal census of 1910. In 1927, 346,000 tons of beets were marketed from Montana farms, the largest production ever recorded in the state. The yield per acre was 12 tons and the value to growers was $2,941,000.

As beets are a cash crop it is apparent that business in a beet-growing district is noticeably stimulated by the introduction of the industry. This has been the case at all points where factories have been established.

In addition to the cash paid directly to growers, are the salaries paid to factory employees during the operating season, and money paid to the railroad companies for freight upon beets, sugar, by-products, coal, coke, lime rock and other supplies, besides a considerable sum to local mercantile establishments for materials necessary to maintain and operate its different forms of equipment.

Hand in hand with the development of sugar beet raising in Montana has gone the developmet of winter feeding and fattening of cattle, sheep and hogs in the factory areas of the state.

More than 100,000 head of sheep and lambs have been fattened in these areas each year for the past several years and an average of about 30,000 head of cattle have been fed for market with beet pulp as the basis of the fattening ration. The market value of livestock fattened in beet-growing districts will annually exceed three millions of dollars, or the value of the beet crop itself.

At the 1928 Montana State Fair, for the first time in the history of the institution an exhibit of sugar and sugar beet products will be displayed.

It is probable that within the next five or ten years, four or five additional factories will be established in the state. Certain plant pests are driving the beet sugar industry out of parts of Idaho and Utah. These pests are not dangerous in the cooler climate of Montana. New factories are under contemplation at Malta, Great Falls, Conrad, Whitehall and other locations in the state.

MONTANA CONDITIONS FOR LIVESTOCK FAVOR EXPANSION

Montana, the third largest state in the nation, with a total land area of about 94 million acres and 1928 total acreage in crops slightly in excess of eight million acres offers a tremendous potential area for the development of a livestock industry of greater importance among western states than it now assumes.

No part of Montana is a desert as is the case with many western states where livestock is important. When Montana stockmen develop the most efficient use of their resources for producing cattle and sheep, double the present number of cattle and sheep would appear to be a very conservative estimate of the ultimate size of the livestock industry in Montana without interfering with the development of the crop farming industry.

New Zealand, smaller than the Treasure State is handling upwards of thirty million sheep. Montana's present sheep population is slightly more than three million. Montana's cattle population is slightly more than one million head. Land taxes in Montana are among the lowest in the nation. Climatic conditions for livestock are among the most healthful, the world over. Opportunity awaits the new cattle man and the new sheep man in Montana, especially the new livestock man who is the type who will first compare Montana's possibilities with those of any other livestock producing area and then determine to combine these natural advantages with the best possible management. To such men Montana offers opportunities that can scarcely be paralleled.

In the livestock section which follows, an effort has been made to draw a true picture of the conditions of the livestock industry in Montana as it is today and as it has progressed since the coming of the early settlers.

The day of free lands is over in Montana, but the day of wasteful use of such free lands is also gone. The speculative spirit has given way to the investment spirit. It is a new day for the reasoning and constructive builder.

Montana no longer holds forth an offer of "something for nothing," but she holds forth in both hands a wealth of real opportunities, unequalled in these broad United States.

In the livestock industry be it cattle, sheep or dairy business, Montana seems surely destined to build new national records of production in the next twenty-five years. These lines of endeavor are all fairly profitable in Montana now. With more efficiency they can be still more profitable. Montana is not inviting speculators in these industries but does invite investors in these opportunities and feels safe in assuring success to this type of settler coming at this time.

THE LIVESTOCK INDUSTRY

Nature Ordained Montana a Natural Breeding and Feeding Grounds—Livestock Industry Half of Whole State Agricultural Industry.

By J. G. Diamond.

To the settlers of 1867 Montana presented the spectacle of a land abounding in all forms of wild life. No other section of the west contained as many buffalo, elk, deer, antelope, beaver, coyote, bear, wolves and wild fowl as Montana territory according to David Hilger, Montana State Historian. In his journey overland by ox-team from Devil's Lake, North Dakota, up the Milk River valley by way of Fort Benton to Helena, Mr. Hilger remembers enormous herds of buffalo which at points actually endangered the emigrant train. All early writers agree on the abundance of wild life in the early territorial days, a fact that testifies to suitability of Montana climate as a breeding and feeding grounds for beast and bird.

Cattle were introduced into the state as early as 1832 by fur traders for beef and butter purposes at the trading posts although the first beef herd is said to have been established by John Grant in 1853. While William Harris is credited with bringing the first sheep to Montana in the Bitter Root valley in 1857, a man named Dobbins is said to have introduced into the Deer Lodge valley the first band of breeding sheep. By 1865 the auditor's records for assessment purposes show Montana livestock numbers as follows:

Kind	Number	Kind	Number
Cattle & Calves	1,896	Horses	1,207
Sheep	1,769	Mules and Asses	464
Oxen	4,325	Swine	249

While no mention in the early records is made of horses, swine and poultry it is believed that the introduction of these classes of livestock had taken place prior to 1865. The first federal census of 1870 found 36,500 head of cattle and calves; 5,300 head of horses; 2,000 sheep; 2,600 swine and 500 mules.

First Cattle Shipments.

The first market shipment of cattle was made by J. D. Hogan of Augusta, the cattle being owned by Patrick Largey of Butte. They were trailed to Salt Lake City, and marketed there. The first shipment by rail was made by Conrad Kohrs in 1874 who trailed overland from the Sun River country to Ogden which was the loading point. After 1876 many shipments were trailed from Montana points to Cheyenne for shipment over the Union Pacific to Chicago. The completion of the Northern Pacific in 1883, gave impetus to the cattle industry and in that year the eastern Montana stockgrowers' association was organized at Miles City. Two years later this was absorbed by the Montana Stockgrowers Association, an organization still functioning actively.

The Texas Drive.

Between 1869 and the late eighties the famous Texas drives brought annually, thousands of cattle into the rich feeding grounds of Montana. These were days of open range and the romance of the cow trails. Briefly the Texas drives, as they were called, were movements of Texas cattle from western Kansas and Nebraska, where range men and cattle buyers met. The concentration of great numbers of cattle at these shipping points brought about the practice of holding cattle for further grazing in areas around this primary market. Fluctuation of prices was also a factor in these operations. Wyoming received very heavily of this overflow and the trails to Montana and the Dakotas were mainly projections of the movements into Wyoming. The early drives consisted almost wholly of steers which were grazed two or more summers and sold at four to six years. Uncertainty of feed and the cold winters kept the cows and breeding stock in the

south at first until the demand for steers became great enough to warrant moving great numbers of cows to the northern ranges. Development of good hay lands to feed these cows through the winters made this change possible and the northern ranges began to produce their own steers.

As the Montana ranges became relatively more heavily stocked aided by improved transportation facilities namely the Utah Northern Railroad in 1880; the Northern Pacific in 1882 and 1883 and the Great Northern in 1887; the trail movements from southern ranges declined.

Between 1880 and 1890 the development of the cattle industry began to meet with other factors which challenged its growth, two of the most important of which were the advent of the homesteader and the development of the sheep industry. Ownership of hay land with a small acreage of range land was until this time combined with an unrestricted use of an immense public domain of range. With the development of sheep numbers which between 1880 and 1890 expanded from less than 200,000 head to nearly two million, difficulties began to arise between cattle men and sheep men over the use of the range. During the early years of homesteading the settlers interferred with stockmen principally by competing for the irrigated lands for which there was a growing demand on the part of the stockmen as the demands for feed increased. From 1900 to 1910, however the settlers went to the dry lands and open range began to be a thing of the past.

Over the whole period 1870 to 1890 cattle numbers increased from less than 50,000 to a little over 1,000,000 head; sheep numbers increased from 2 000 head to little less than 2,000,000 head; horses increased from about 5,000 head to a little more than 200,000 head; swine increased from less than 3,000 head to about 29,000 head. In this same period the number of farms and ranches increased from 851 to 5,603; all land in farms and ranches from about 139,000 acres to about 1,964,000.

Obviously such development as the state experienced during this period was almost entirely a development of its livestock industry.

In the next decade (1890-1900) cattle numbers increased steadily and sharply during the first half of the period but fell away as sharply again the second half, scoring a slight net loss. Sheep numbers, on the other hand, expanded to slightly over 6,000,000 head. The total number of farms and ranches more than doubled but was still less than 15,000.

Between 1900 and 1910 cattle numbers again about held their own; sheep numbers reached their record population in 1909; the number of farms again doubled, now reaching about 26,000 and showing a total valuation of all farm property of the substantial sum of $347,838,770 as reported by the federal census of 1910. This period saw a definite change in the whole character of the livestock industry.

"By 1910," says M. L. Wilson of the State Agricultural Extension Service in his bulletin 45 (March, 1928), "many cattle men were in a more or less crowded condition especially those in localities of level land which offered farming possibilities. Cattlemen in the rougher country were not as badly disturbed except from possible homesteading on summer range which was rather plentiful even at this time."

Passing of the Open Range.

During the period 1890 to 1910 cattlemen were forced to gradually increase their holdings of owned land, principally hay lands. Settlers in some cases after obtaining patents to their lands sold out to stockmen at low prices. Some settlers abandoned their claims after a season or two of poor yields. The change of the livestock industry from the order of free range and large outfits with small land investment over to a basis of owned land fenced ranges and more intense feeding of smaller herds was a gradual one that took shape as soon as it was realized that the homesteader on the range had come to stay.

The period 1910 to 1920 saw the greatest influx of drylanders (as settlers were beginning to be called about 1910) that had yet come. It also saw the rise and fall of a promiscuous attempt on part of the settlement movement to "settle" on everything that was "settleable." Encouraged by fairly good crop yields from 1910 to 1916; the passage of the 321 acre homestead law in 1909 and the 640 acre law in 1916 the settlement movement boomed, until checked by the period of drouth during 1917, 1918 and 1919 which forced much of the inferior lands out of cultivation and many worthwhile settlers departed. This period as a whole

was a trying one for the livestock industry which saw the last of much good range land go under plow to produce weeds and bankrupt homesteaders. Out of the period however, the state emerged with nearly 58,000 farms against 26,000 at the beginning of the period and a definitely established agriculture that was almost as important from the crop side as from the livestock. True, this new agriculture was deeply in debt to everybody, including the state and the government, but it had accumulated a fund of experience which is now believed to have been worth its money cost at least.

New Type of Agriculture.

The period following 1920 found the cattleman in critical condition for several years during which the low cattle prices continued. Taxes, debt, interest and other costs, simply could not be met in many cases and in these cases cattlemen went out of business. The sheepman recovered quickly from a short period of low prices immediately following the close of the war and by 1923 was again rapidly building up his holdings. Between 1920 and 1925 the new agriculture had accomplished two things: (1) It had discovered that there is room in Montana for both the livestock industry and the general farmer; (2) It paid off more debt than probably any comparable group of agricultural producers anywhere.

From 1923 to the present time sheep and wool prices have continued on levels that have brought relatively prosperous conditions among sheepmen. During the past year cattle prices have reached a level that insures relative prosperous operations of cattlemen for some few years to come. Milk cows, hogs, poultry, and bees have all made important strides in production during the past eight years. The total value of livestock production of all kinds in the state continues to grow steadily. At the same time the total value of farm crops has grown tremendously during the past eight years. Neither industry is at present growing at the expense of the other, yet both are unquestionably growing.

THE CATTLE INDUSTRY IN MONTANA.

The history of the cattle industry in Montana as we have noted has been largely the history of livestock itself, until recent years and in the early days the cattle history was essentially the history of agriculture.

Aside from the records of the accumulation of numbers and growth of markets there are other angles of the industry that are important historically. These angles constitue the economic history of the cattle business in Montana. Economic history as viewed through the eyes of an individual living through the space of time in which such changes have occurred is the experience and life itself of that individual. Unfortunately individuals live too short a life span to profit from the experience as a whole, the whole being a thing made up year by year.

One man's experience, however, along general lines is a common one with that of all his fellows in the same game, and at the same time. The value of all experience as expressed commonly in the statement—"If I were to do this all over again"—is a real one, too little of which finds its way into the minds and plans of those who follow in that line.

In the early days of cattle production in Montana under conditions of free usage of immense areas of public domain a small ownership of land and little fixed capital was necessary. Enough hay was raised to carry cows with calf through the winters and steers in normal years shifted for themselves. Stock were moved from winter or sheltered ranges to summer, or open ranges in the spring and trailed back again in the fall. Branding and rounding up herds were attended to by the various crews looking after the interest of their respective employers. The hazards were chiefly over-stocking of ranges, poor hay crops and bad winters which could occur singly or in combination.

Such an unfavorable combination occurred in 1886-87. Ranges were heavily stocked and grazing conditions during 1886 were below normal. The hay crop was short and the following winter was severe. Cattle died by the thousand and financial losses were heavy. This season from the summer of 1886 to the summer of 1887 was recorded as the most unfavorable of the cattle man's experience in Montana.

Generally speaking the period from 1890 to 1910 was a favorable one for the industry. In a few years in this period grazing conditions and hay crops were poor. The homesteader did not become a serious factor on the public range until

along toward the close of this period and the only difficulties cattle men encountered in using the public domain were the rights of other cattle men and the increasing numbers of sheep. Such disagreements as occurred were after the fashion of the day, fought out satisfactorily.

Cattle prices which had been working downward to 1890 began rising definitely; by 1897 the Chicago price had crossed above the four cent line where it remained until about 1902. From that year to about 1906 prices were lower but after 1906 they again headed definitely upward. The industrial depressions of 1893 and 1907 were without important effects upon the industry.

The period 1910 to 1920 was marked by two important economic events outside the cattle industry itself but which had considerable effect upon the industry. The first of these was the severe encroachment of homesteaders upon the public domain to a point where cattlemen were forced to production under conditions of fenced range and smaller herds. Although this trend had started earlier than the period named, its full effect was now apparent. The second of these events was the world war and its stimulating effect upon production as a result of higher beef prices. To what extent cattlemen would have been able to profitably adjust their methods of beef production in response to the pressure of the settler's encroachments, without the inducement of the world war to stimulate production, is problematical. In any event we find cattlemen emerging from this period as large land owners of both hay lands and grazing lands. In some cases stockmen moved from original holdings to localities adjacent to the National Forest in which cases the necessity of owning large tracts of grazing land was obviated.

Slump Years.

Although marking a considerable expansion of the production of beef in Montana the period 1910 to 1920 was not one of real prosperity. On one hand the actual prices of beef to the grower concealed a declining purchasing power of the beef dollar brought about by the fact that beef prices did not really increase as fast as the general inflation of other commodity prices. In fact when the break in prices came in 1920 the purchasing power of the beef dollar had dropped to a point below that of any year since 1880 although beef was bringing about eight cents at Chicago in December, 1920, against less than four cents in 1880.

The years 1917, 1918 and 1919 were dry years; grazing conditions were poor and hay prices high. High prices were encouraging the contraction of considerable debt to buy land more livestock and, in some cases, feed. The year 1919 climaxed the dry period with cattle coming off ranges thin and in generally too poor a condition to ship, at favorable prices. Hay was scarce and high priced with the certainty of still higher prices even with normal winter weather.

Some cattle were sold for what they brought that fall; some were shipped out of the state to winter; the rest were kept for wintering in the state. The total railroad movement out of the state for 1919 was the largest in the state's history and in some cases car shortage alone prevented further shipments. However, those who retained their cattle were encouraged by the local values. It was possible to borrow up to $20 per head on basis of stock that was priced from $55 to $70.

Then came the winter of 1919-20. It was what the stockmen would call a "tough one" any time but in 1919-20 conditions were made "tougher" by a general scarcity of feed. Hay that was high priced at $30 per ton during the preceding fall in extreme cases reached $60 per ton by late winter. Horses that were not needed as work stock were turned loose on the range to save scant feed supplies for cattle and sheep. In some cases horses were reported shot and fed to hogs. Where the average loan on cattle was $20 per head in the fall, the average amount loaned as a result of wintering charges by spring had reached about $35 per head, according to estimates of the Agricultural college. In 1920 the decline in cattle prices brought the value of cattle itself to from $30 to $35 per head. Forced sales in 1920 in many cases not only failed to realize the amount of indebtedness on cattle but in some cases of poor stock barely more than paid expenses to market of cattle and attendants.

Needless to say by 1920 the cattle business as a whole was in critical shape. For the next seven years prices were destined to range about a very low level. It was that part of the cattle cycle when cattlemen were marketing everything marketable to satisfy creditors.

New Methods.

One apparent benefit of the experience of 1919-20 was to encourage a practice of holding large hay reserves, accumulated during good seasons for the occasional bad season or hard winter.

During the period 1920 to 1925 some conditions affecting the cattle business improved but prices continued relatively low and the cattle man was forced to expedients that would beat the game of high production costs and low market prices. The favorable factors, let it first be stated, were more favorable grazing seasons and hay crops and a slight downward trend of taxes. The effect of prices can best be shown by the following table of prices of beef converted into indexes of what the dollar received for cattle and calves would buy in terms of other commodities first taking the average cattle prices for the period 1909-1913 as 100 per cent.

Purchasing Power of Beef Compared With Other Meat Animals.

YEAR	Cattle	Calves	Sheep	Lambs	Hogs
1918	97	94	128	126	117
1919	94	95	106	111	113
1920	68	73	77	84	75
1921	63	70	60	73	65
1922	62	68	78	98	69
1923	63	69	85	104	58
1924	67	74	92	112	64
1925	73	80	103	127	93
1926	77	88	101	122	101

In the foregoing table it will be seen that 1921, 1922 and 1923 were critical years for cattlemen, but that a definite improvement was evidenced during 1924, 1925 and 1926. It was not until 1927, however, that many cattlemen realized that the turn in the lane had been reached and that the cattle cycle for them was now on a dividend paying basis. By October, 1927, the purchasing power of beef reached 95 per cent or slightly better than the average of the year 1919. By November, 1927, it crossed the par line and stood at 101 per cent an increase of 20 points compared with November, 1926.

During the period of low cattle prices, Montana cattlemen were forced to a greater flexibility in production. They lowered the age of their marketing and shifted from a steer herd to a cow herd basis. In this way they increased their rate of turnover, marketing large numbers of younger livestock. The extent to which these tendencies have developed is indicated by the following table which shows the consist of Montana holdings of cattle when enumerated by the census of 1900; that of 1910; 1920 and a special sample of holdings by representative stockmen in 1926.

Shifts in Age in Montana.

As on January 1st.

	Steer 1 Year and Under 2 Years. Per cent of Total %	Steers Over 2 Years Per cent of Total %
1900 Census	36	64
1910 Census	..	..
1920 Census	52	48
1926 Sample Survey	61	39

Shifts in Sex in Montana.

As on January 1st.

	Cows (000 head omitted)	Steers	Number Steers per 100 Cows
1900 Census	311	312	100
1910 Census	373	261	70
1920 Census	384	227	59
1925 Census	590	194	33

The pressure which was largely responsible for these tendencies in production is now largely removed by the present high beef prices and especially the premiums of 1927 for the heavy, aged steers. Whether Montana cattlemen will revert to a steer herd basis in favor of the present cow herd basis remains to be seen.

However, the demand for heavy steers in 1927 was probably not any greater

than that of other recent years and the advance in prices appears to have been brought about largely through a real scarcity of this class of beef. Only a few years ago heavy steers were being discriminated against. On the other hand in recent years there has been some preference in demand for younger beef which fitted in very well with Montana practices up to date.

Further light on practices of Montana cattlemen with respect to breeding and marketing is afforded by a study of the excellent records of sex and class inspections made annually by E. A. Phillips, secretary of the Montana Livestock association. These records cover the slaughter of Montana cattle in eastern markets.

Cattle shipments from Montana since 1885 are also available through the records of the Montana livestock association and constitute the most accurate record of yearly exports. These yearly shipments are shown in the following table.

Analysis Cattle Exports 1920-1925

Inspection records of the state office of brand inspection show the following classification of Montana cattle exports as steers, cows, calves and bulls for the period of 1920-1925 inclusive.

YEAR	Steers %	Cows %	Calves %	Bulls %	Total %	Total Classed (head)	Total Exports (head)
1920	54.5	40.7	3.1	1.7	100	190,614	211,000
1921	78.5	16.9	3.4	1.2	100	111,739	147,000
1922	65.2	29.3	4.0	1.5	100	217,821	246,000
1923	55.0	37.0	6.0	2.0	100	258,040	343,000
1924	58.0	35 0	5.0	2.0	100	266,678	321,000
1925	51.4	41.1	5.7	1.7	100	335,408	504,000

Montana cattlemen will continue to make their production plans and adjust their practices in the light of individual experience. They can watch carefully the class and quality of beef that is demanded by consumers and make their adjustments on that basis with the probability of more success in the long run than if they were to be guided by temporary price fluctuations in any particular class.

The Value of Experience.

The past 50 years history of the cattle industry in Montana were rich in experience such as is too often lost to the operator who must face similar problems

ON A MONTANA FARM

in the present and future. It is with the thought that this brief outline may be of value to prospective settlers in cattle and students of the industry, as a reminder that for the solution of any problem of the present we should first look into past experience.

The Cattle Cycle.

Montana's cattle industry at present is in the first stage of a period of relatively high cattle prices and light marketings which has followed a period of low prices and heavy marketings. The periodic swings of these two basic factors from high points to low points and back again to high points in the past have averaged from 14 to 16 years. This means that an average of 7 to 8 years elapses before high prices give way to low prices and about the same space of time before low prices again give way to high prices. If cattle operators respond to the present high prices in a way similar to the way they have responded in the past, since cattle records are available, they will increase their holdings to a point where marketing will be heavy enough to bring about low prices again. When low prices prevail a curtailment of production will again ultimately bring about relatively high prices.

High Prices and Low Supplies.

In the stage of high prices the degree to which stockmen increase their breeding stock and to which new operators enter the business determines the peak these prices will reach by the amount of marketable numbers that are withdrawn from markets for these purposes. In the stage of low prices the low price is influenced by the extent to which operators are forced to sell of their holdings to satisfy indebtedness acquired during the expansion period; at such times many of the new operators who came into production when prices were high, become discouraged or are forced out.

Other price factors may cause temporary price fluctuations but none will upset these periodic swings in average cattle prices so long as producers continue to respond to high prices by increasing their production which ultimately leads to larger marketings and lower prices again.

Recognition of the cattle cycle in plans of cattle operators generally would smooth to some extent the peaks and valleys in the periodic price swings and add stability to the business.

Montana Cattle Industry Today.

In contrast with the organization of the cattle business in Montana of twenty-five years ago, today finds the industry with a relatively large investment in owned land and other equipment involving fixed charges in the way of taxes, interest or depreciation that are highly inflexible. In times of high prices for cattle these charges represent a relatively small percentage of those prices and in some cases encourage operators to increase their land and equipment as a basis for further increasing their holdings of cattle. Consequently in times of low prices when holdings are reduced the charge of taxes and interest on land indebtedness becomes disproportionately large and a reduction of these charges usually involves a liquidation of some of this inventory at a loss. This is a problem facing the operator today. To what extent is he justified in increasing his ownership of land or acquiring other debt for restocking in response to present high prices and the prospect that while these high prices will continue for the next few years they will be followed ultimately by lower prices when production again overtakes market demands. It is not a question of whether he shall take on any new debt or not but a question of degree of such indebtedness and of the employment of such new capital in such a way that the increased production resulting from it shall receive the higher prices on basis of which it was borrowed. Obviously the best time to have brought new capital into the livestock business in Montana was during the last stage of low cattle prices when it should now be enjoying a high return. While it is true that many Montana cattlemen who are large operators, did expand during the past few years, it is likely that the large bulk of small operators and many new operators will now be found in line for credit extensions based on the present high cattle values.

New Problems.

Another problem facing the industry today that was not important in the

days of unlimited range is that of insuring an adequate feed supply both of range feed and hay for winter feeding. A better uti ization of ranges is necessary if carrying capacity is to be maintained.

In fact producing capacity of ranges could be increased according to those who have studied this problem. As against inefficient use of grazing lands and the purchase of more land to increase numbers carried, a more efficient use of present units is a highly important consideration. In the matter of hay production, the question of reserves is important. Good hay years and poor hay years if left to themselves to determine the amount available for winter feeding would result in a highly fluctuating supply. The most successful operators cut all the hay possible each year and feed out hay from a large crop as efficiently as that fed out from a short crop. In this way they build up reserves against the short hay crop years. In years when other operators who are out of hay are selling cattle or buying hay to feed what they hold, the provident operator is selling reserve hay at a good price or is buying cheap cattle to feed out his surplus.

Flexibility Is Desirable.

The ideal to be kept in mind by the Montana operator is that of keeping his business as flexible as possible. By flexibility is meant the ability to increase or decrease his out-put in response to price changes with about the same turnover as that of prices themselves. High prices would then find him with expanded inventories and low prices with contracted inventories. If cattle operators universally did this there would of course be no cattle cycles, but so far as the Montana operator is concerned he may be assured that human nature is not such that all cattlemen will be likely to do this and with this in mind the Montana cattlemen are in a position to add one more advantage to the natural advantages they enjoy in cattle production. This advantage is that of intelligent use of the cattle cycle to increase profits in periods of good prices and to reduce losses in periods of low cattle prices.

CATTLE ON MUSSELSHELL BOTTOMS

SHEEP.

The importance of the sheep industry in Montana is indicated by the fact that the industry in 1927 returned to growers from sales of wool, lambs and sheep a total of $19,486 000. There were according to the federal census of 1924, 4,552 farms and ranches in Montana reporting sheep compared with 28,755 farms reporting beef cattle, 17,586 farms reporting dairy cattle and 24,913 farms reporting swine. This illustrates the highly concentrated nature of the sheep industry in Montana.

Since the census of 1924, there has been a considerable increase in the number of small bands and farm flocks but on the whole the sheep industry in Montana is still largely on the basis of relatively large outfits to which the operator devotes his entire time and capital.

Unlike the cattle industry which is just entering a period of relative prosperity, the sheep industry has enjoyed a good market demand for both wool and lambs since 1923. On the other hand, like the cattle industry, the sheep industry has passed through periods of relative prosperity and depression and has been subject to economic forces during the past 50 years of its development in Montana that have played an important part in that development.

It is the purpose of this article to recite briefly the history of the sheep raising in Montana and to discuss the present status of the industry together with its outlook.

Adaptability of Montana for Sheep.

Probably the first question that occurs in consideration of the reasons for the development of sheep raising into the important position occupied in Montana agriculture is that of the general adaptability of Montana conditions for sheep raising. These conditions are claimed by some to be even more favorable than with cattle. It is also claimed that Montana conditions are better adapted to the Merino and fine wool types than most of the sections of the inter-mountain region, in fact the high quality of Montana wool is reflected in the average gradings of 20 per cent fine wool and 80 per cent medium. Weights per fleece over a period of more than 20 years have varied mostly between 6.8 pounds and 8.3 pounds with the average of later years indicating that average weights have passed the 8 pound figure. This compares with the U. S. Average of 7.6 pounds. In 1927 Montana was fourth in wool production in the United States and third in average weight per fleece. Montana's average weight was 8.6 pounds while Washington averaged 9.4 pounds on a clip about a fifth the total of Montana and Oregon averaged 8.8 pounds on a clip about two thirds the size of Montana's. Of the three states exceeding Montana in total size of clip not one equalled Montana in average weight per fleece.

Combined with the advantage of good weight and quality of fleece in Montana is the quality of Montana lambs which have always met with a good demand on part of feeders. Illustrating this situation is the fact that nearly half of Montana's lamb exports are shipped direct to feeders in the corn belt states and western feeding areas.

Montana Now in Second Expansion Period.

Montana is now in the second expansion period of her sheep industry. The first expansion period marked the development of the great flocks of the open range days and saw a rapid and substantial increase from less than half a million head in 1880 to slightly more than six million head between 1900 and 1906. From 1910 to 1920 a sharp steady decline was noted until a low point of close to two million head was reached by 1920. During this decade the war demand for wool and mutton as a stimulating factor in production was more than offset by a period of short feed years from 1917 to 1919 inclusive as is indicated by the fact that total numbers at the beginning of 1914 were 3,850,000 head and in January, 1919, had contracted to 2,579,000 head. The unfavorable feed conditions and hard winter of 1919-20 further reduced numbers by January, 1920, to 2,083,000 head. A steady upward swing in numbers has been evident in the period 1920 to 1928 and in January, 1928, the sheep population had passed the three million mark again.

The First Expansion Period.

During the first expansion period of the sheep industry in Montana which assumed importance after 1890, sheep operators were competing freely with cattlemen for range rights. Contentions over comflicting rights during this period often assumed the nature of open warfare between sheepmen and cattlemen. These conditions not only prevailed in Montana but also in other states of the northern great plains area and resulted in the enactment of certain herd laws within these states which today are still on the books although their usefulness passed with the open range days.

The Passing of Free Domain.

The factors which terminated the first expansion of the sheep industry in Montana were: (1) The passing of the public domain with the entrance on the range of the homesteader. (2) The inability of the sheep industry as it was then organized to adapt itself readily to the new order of fenced ranges. As was the case with cattlemen many sheep operators who had acquired large tracts of land took advantage of the increased value that agricultural developments had placed upon their holdings during the period 1910 to 1915 and sold out.

The World War.

Thus the sheep industry was in the process of liquidating its holdings when the world war opened. Apparently the response of Montana sheepmen to the higher prices of the war period was that of still further reducing their inventories by profit taking on these prices as witnessed by the fact that total numbers continued to decline from 3,850,000 head at the beginning of 1914 to 2,670,000 head at the close of 1916. The poor feed years of 1917, 1918 and 1919, then intervened to prevent any expansion during that period as might otherwise have been expected with the continued rise on sheep and wool prices.

The fairly favorable feed conditions of 1920 were accompanied by a break in both sheep and wool prices. Commitments made that year along expansion lines

HOW MONTANA GETS ITS REPUTATION FOR FINE WOOL

were disastrous as were also the investments of new operators venturing into the sheep business in that year. Such distress as was visited upon sheepmen with the deflation while severe was short lived. In the first place the industry had not inflated during the war period and its obligations were largely those of feed bills for the winter of 1919-20 and such credit extensions for expansion as had been made in 1920. The sharp depreciation in sheep and wool values that took place between 1920 and 1922 was met as well as possible by existing credit facilities on part of banks and associated credit agencies. That the bulk of sheepmen weathered the storm and were able to recoup their losses over the period 1923 to 1926 is testimony to that conclusion.

Present Condition Good.

The recovery of the sheep business since 1923 has been accompanied both by an expansion of numbers on part of the larger operators as well as the development of farm flocks some of which have been on the cooperative share basis. Since 1923 prices of both wool and lambs have fluctuated around levels that have been relatively profitable for this expansion.

To what extent the expansion has been accompanied by better management on part of sheepmen tending to reduce production costs and thus making the development less dependent upon price changes which may come, is difficult to determine in view of the scarcity of authentic data along these lines. However, it is the observation of those interested in the development of the industry that more interest is now being shown by sheepmen in securing a better market product in case of both wool and lambs than during the pre-war period.

The cooperative spirit among sheepmen today is evidenced by the growth of the Montana wool growers association. Through this association as well as through the extension services of the agricultural college there has been brought about more interest generally in the marketing end of the sheep business.

A Brief History of Montana Sheep Prices.

From 1883 to 1926 the average value of sheep in Montana as published for January 1, each year by the U. S. Department of Agriculture, has ranged from $1.51 per head in 1895 to $12.60 in 1918. From a value of $3.04 per head in 1883 the yearly changes show a downward trend to $1.51 in 1895. From this low point the trend was upward reaching $3.90 in 1908. From that year the trend on the whole was downward reaching $3.70 per head in 1914. The effect of the world war starting in July of that year was to sharply increase sheep prices which rose to a new peak of $12.60 per head in 1918. The price break immediately following the war through 1920 and 1921 carried the post-war low price to $4.70 per head in January, 1922. The post-war recovery starting in 1923 carried prices upward again to reach an average of $11.36 in 1926. Since then prices have fluctuated slightly showing a small net recession.

Lamb Prices.

Lamb prices on the same basis are available since 1894 and show the following trends: From a low point of $1.15 in 1895 a high point of $3.10 was reached in 1908. By 1912 values had dropped again to $2.20, with the war obscuring the real trend through 1913 and 1914. The war peak was reached in 1918 with an average value of $9.00 per head and the post-war low point was reached in 1922 with an average of $3.80 per head from which recovery to $9.00 again was reached in 1926.

The prices quoted for sheep and lambs above are not market prices but farm or ranch values as estimated yearly by the stockmen reporting to the crop estimates division of the U. S. Department of Agriculture. They constitute a long series which for many purposes are much more desirable in studying agricultural trends than would be market prices.

A study of prices themselves would be misleading if consideration was not given to the purchasing power of the prices studied. If the purchasing power is relatively low as was the case for sheep and lambs during the war period it greatly weakens the value of the price trend itself as being an index of the relative prosperity of the sheep business.

The Outlook for the Industry.

The sheepman is faced with a much more complex problem than is the cattleman in studying the production and price trends of his business and the factors

which affect them. On one hand the per capita consumption of lamb and mutton is the lowest among the meat group and variations in consumption are therefore relatively important. Over a long period of years sheep and lamb prices have been so sensitive to variations in general economic conditions as to be almost barometers of business especially in view of the tendency of sheep prices to anticipate rather than follow fluctuations in general business conditions. An important factor in sheep and lamb prices are the supplies and prices and consumption of wool.

Any approach to an intelligent comprehension of the factors affecting the prosperity of the sheep business must be one of considering the national and international factors which in the long run must determine the periods during which Montana sheepmen will be relatively more or less prosperous than in other periods, so far as markets and prices are concerned.

This phase of the sheep industry, has nothing to do with the natural advantages Montana offers sheep growing. Nor need it interfere in any way with the ultimate fuller development of the possibilities in sheep raising in Montana. The value to the Montana sheepmen in studying general trends and keeping informed on current changes, but offers the Montana sheep grower, as is the case with the cattle grower, another advantage in that he may more logically adjust his operations to take advantage of the periodic swings of the sheep business rather than have these economic forces take advantage of him.

Wool Outlook Good.

In any outlook of the sheep industry both wool and lambs must be considered since the prices of both are interrelated and both exert an influence upon the production plans of sheepmen.

In the wool end of the industry at present the tone of the future outlook is admittedly stronger than in case of lambs. In the five leading countries of the world producing the large bulk of the annual world clothing wool supplies and including Australia, United States, New Zealand, New South Wales and South

ON A ROUNDUP IN CARTER COUNTY

Africa, production during the post-war period has been substantially increased. Some observers of this increase see already the peak reached in case of Australia, the world's largest single producer and some include also New Zealand and New South Wales. The United States alone in this group is the one country where it is generally conceded that any further substantial increase could take place. On the other hand any continued improvement in European industrial conditions may be expected to reflect itself in an enlarged demand for wool. The relatively strong world consuming demand for wool is partly reflected in the fact that world prices during the past several years of American tariff on wool have at times exceeded domestic prices.

From the wool standpoint alone American producers of wool have a situation where present production is still much below national consumption of wool. For 1925 a total production of fleece and pulled wool in the United States of 292,362,000 pounds was supplemented by net imports of 329.286,000 pounds to account for an apparent consumption that year of 621,648,000 pounds. To have produced all the wool used in the United States that year would have required that sheep numbers should have been more than doubled. There is nothing therefore that is basically unfavorable from the wool standpoint with the probability that it would take many years for the United States to produce the amount of wool that has been consumed on an average for the past ten years without recourse to imports. The present tariff on wools not specifically provided for otherwise is 31 cents per pound clean content and is designed to give the American wool grower preferential rights in the big American market.

Can Market Lamb Production Be Expanded.

In Montana where the lamb is regarded as the principal source of income to the sheep grower, the price of lambs and the outlook for market lambs is relatively more important to growers than is the outlook for wool. As is the case with wool, the United States does not produce all of the mutton it consumes. Mutton and lamb imports like wool are subject to tariff and on a fresh basis mutton carries a duty of 2½ cents per pound and lamb a duty of 4 cents per pound. However, the excess of consumption of mutton and lamb in the United States over domestic production is not nearly so wide as is the case with wool. In 1926 the total dressed weight of mutton and lamb slaughtered under federal inspection in the United States was 500,888 000 pounds. In that year imports of mutton were 2,770,000 pounds and exports 1,464,000 pounds or an excess of imports over exports of 1,306,000 pounds.

Annual Per Capita Consumption of Lamb and Mutton, Beef, Veal, Pork, 1907-1923.

Year	Lamb and Mutton	Beef	Veal	Pork, Excluding Lard	Lard	Year	Lamb and Mutton	Beef	Veal	Pork, Excluding Lard	Lard
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.		Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
1907	6.4	79.7	7.1	74.1	12.5	1916	6.1	57.3	5.3	73.1	14.4
1908	6.2	72.4	6.8	85.4	14.3	1917	4.6	61.1	6.5	58.5	11.9
1909	6.6	76.2	7.5	68.6	11.6	1918	4.7	65.2	7.4	67.6	13.6
1910	6.5	71.8	7.4	60.3	10.5	1919	5.8	58.0	7.7	68.6	12.8
1911	7.8	68.4	7.0	75.1	11.8	1920	5.5	61.2	7.9	69.0	13.1
1912	8.2	61.7	7.0	70.6	11.4	1921	5.9	57.2	7.0	72.9	11.3
1913	7.6	60.8	5.0	72.5	11.7	1922	5.0	60.8	7.3	75.7	14.3
1914	7.5	59.3	4.4	70.3	12.1	1923	5.2	61.9	7.9	86.1	15.4
1915	6.4	56.0	4.3	70.2	13.2	1924	5.3	62.4	8.3	86.3	15.6
						1925	5.3	63.1	8.8	77.1	13.4

Obviously if sheep production was increased in the United States to a point where domestic consumption of wool were to be satisfied, long before this point was reached the sheep grower would be on an export basis for his surplus lamb and mutton, assuming the same apparent consumption of these meats that has characterized recent years.

Since 1924 the sheep industry of the United States has added an average of 1,130,000 to their total sheep numbers yearly while they have added only 294,000

head to the yearly inspected slaughter of this period. This means that the increased lamb production during the period 1924 to 1927 has been primarily for expansion in total sheep numbers, and has not been primarily for the purpose of meeting an increased market demand for lamb. There is thus the likelihood that, if for any reason sheepmen should reverse the recent trend of expansion, the slaughter market would be called upon to absorb a much larger supply than the average of recent years.

Sheepmen would appear to have some opportunity of increasing the national consumption of lamb and mutton considering the present low average per capita consumption of these meats and thus enlarge the market outlet for the meat product of the industry. Western sheepmen producing a superior quality of lamb and mutton should be the leaders in such a movement. In any event the problem of the sheep grower ultimately would appear to be one of finding an enlarged market outlet for the meat product of his business.

Inspected Slaughter and January 1, Total Sheep in U. S. 1923-1927.

Year	January 1 Number Sheep & Lambs	U. S. Inspected* Slaughter During Year
1923	36,212,000	11,558,550
1924	38,876,000	11,990,831
1925	38,112,000	12,000,994
1926	39,730,000	12,881,000
1927	41,846,000	12,882,000
1928	44,545,000	.....

*U. S. Inspected slaughter does not include farm slaughter which will average something over 3,000,000 head each year.

Room for More Sheep in Montana.

In summarizing the general situation of the sheep industry in Montana the first important consideration is the strong financial position of the sheepman, brought about by the series of favorable years for marketing of both lambs and wool that he has enjoyed since 1923. Compared with market prices during this period his production costs have been very favorable and his margin has not only permitted him to clean up old war indebtedness but to expand his industry to a point where his total yearly output is nearly equal to the high war year. With the many natural advantages offered in Montana to the production of both high grade wool and lambs it is not unlikely that the expansion of the sheep industry which we have witnessed for the past five years will be carried forward, to some extent at least regardless of the present general outlook for the industry. Ultimately it is possible that Montana will again see as large a population of sheep as that of her peak year of numbers in 1909 when slightly more than 6 million head were estimated on Montana farms and ranches. During the past few years many new operators have entered the business especially in the form of small flock owners. Large operators have been to some extent increasing holdings of both land and breeding stock. On the whole, however, the expansion has been orderly and prices for breeding ewes while relatively high have not been out of line with those paid in other important sheep states.

SHEEP IN PONDERA COUNTY

LEADING LIVESTOCK COUNTIES

The fifteen leading livestock counties of Montana both in point of livestock population and in value of livestock products marketed are: Beaverhead, Yellowstone, Fergus, Cascade, Blaine, Valley, Rosebud, Phillips, Custer, Lewis and Clark, Dawson, Sweet Grass, Chouteau, Big Horn and Park.

The counties of Montana retained about the same relative positions in regard to numbers of livestock on farms at the beginning of 1928 as they held in 1925 when the last census of livestock was taken by the United States department of commerce.

Southeastern and southwestern Montana are generally acknowledged the leading stock districts of the state.

The total number of livestock on Montana farms, January, 1928, was 5,134,000 head valued at $112,278,000 as compared with 5,003,000 head valued at $91,669,000 on January 1, 1927.

SWINE.

The earliest census record of swine was taken in 1870 when 2,600 were recorded. In 1927, 240,000 were enumerated. An increase is shown for this year, the number on January 1, 1928, being estimated at 264,000.

The increase in numbers of swine came with the increased acreage in corn and alfalfa, the short corn crops of the last two years being responsible for the curtailment in marketings. The peak of exports was reached in 1925 when 225,000 were marketed. In 1926 the number decreased to 166,000 and a further decrease was shown in 1927 when marketings totaled only 109,000.

The bulk of the hog exports go to western markets, the Portland markets taking light hogs and the Chicago markets taking the heavy hogs.

Indications show that the principal factors leading to heavy weight hogs on the eastern market are: first, lower overhead cost in size of breeding herd, farrowing and feeding equipment; second there is a "fashion" for big-type hogs; third, the demand of the lard makers has caused large hogs to command a premium.

Factors favoring light weight hogs are indicated as: giving cuts more suited to the family trade; more rapid turnover of invested capital; lower cost of gains in terms of feed consumed because these costs increase as the pig gets older.

Statistics show that the mountain states have doubled their production in the last few years. However, both the north and south Pacific states have undergone a decided decrease in production during the same period.

As swine production proportionately falls off in the coast states, Montana will have an increasingly better market. Growing population in the northwest also is making a market for Montana swine.

It is believed that two distinct swine industries will be developed in the state —one located in those irrigated districts not adapted to corn but to alfalfa and small grains where feeders can be economically raised and disposed of in the corn districts for finishing.

The principal grains used in the production of pork are corn, barley and rye. Barley is the standard grain in the higher mountain valleys, while in the eastern section of the state, where corn yields well and matures satisfactorily, this crop is becoming the principal feed. Alfalfa, red clover and sweet clover furnish the principal pasture forage crops and hay.

Methods of production and equipment necessary, vary but little. Both spring and fall litters are produced although the majority of pigs are farrowed in the spring and marketed in the fall or early winter months. The bulk of marketings are made in December and January. There is usually a good demand for feeder pigs from the old Corn Belt states, but with normal feed supplies, more profit can usually be realized by finishing to a market weight.

The practice of hogging-down the low-growing varieties of corn in the corn producing sections of the state, is rapidly increasing. Alfalfa or sweet clover forage available while the hogs are in the corn field, are the most practical supplements.

Hogs in Montana are practically free from disease and losses from outbreaks of cholera are very few. In fact, only a very small percentage of the hogs are ever vaccinated against this disease.

There is considerable opportunity for increasing pork production, especially in sections adapted to corn growing. The recommendations of the Livestock Committee of the various sections, cooperating with the Montana Extension Service, are as follows: **Central Montana:** It is recommended that pork production be continued as a sideline to the livestock business. A feed reserve is necessary for safe operation. Corn should be grown more extensively.

Western Montana: Considerable expansion in pork production is justified to supply a deficient west coast market that may be reached at an advantageous freight rate. Dairy by-products, cheap forage and high yields of barley and soft wheat that make for economical gains put this section in a favorable position in the competition with other regions.

North Central Montana: It is recommended that pork production be increased since hogs produced in this section have an advantageous freight rate to an undersupplied west coast market and the feeds produced in this section make for economical gains that may compete with other sections.

North Eastern Montana: It is recommended that more hogs be raised and forage crops of either spring rye, sweet clover or alfalfa should be available. For late summer feeding, hulless barley to be followed in the fall by a corn field of sufficient size for finishing, is desirable.

The hog business should be started on a small scale. Increased production should be limited to the increase in feed crops.

The total value of hogs marketed during 1927 was $2,734,000, as compared to $3,896,000 in 1926. The decrease in the 1927 production is attributed in a large measure to unfavorable spring farrowing condition. The outlook for producers of hogs in Montana is more favorable for 1928 than it was for 1927.

HORSES.

Marcus Daly, nationally known as a breeder of fine race horses, was one of the first to demonstrate that Montana feed and climate, used with intelligent management and careful breeding would produce horses of stamina, substance and quality, unexcelled by stock from other sections of the country.

The range horses of the early days played a prominent part in the history of the state. The demand of the Boer war caused the greatest expansion in this industry and during the years 1895 to 1919 the sale of horses provided a large part of the state's income from livestock. Horse production at one time was the only source of income of some ranchers. Horses were raised in the open, exclusively on native grazing, both summer and winter. They were sold generally in the large centers for work on the streets and for export trade. Development of the truck and automobile, however, has to a certain extent eliminated this demand. Horses of excellent draft type, fine quality in feet and legs, and weighing from sixteen hundred to a ton, are produced on many Montana ranches today.

The earliest record of numbers of horses is 1870 when 5,300 were enumerated. The high peak was reached in 1919. With the ending of the World War and the rapidly increasing use of automobiles and tractors, the numbers of horses have steadily decreased and are now at the lowest ebb since 1916. On January 1, 1928, there were reported on Montana farms and ranges 536,000 horses as compared with 547,000 in 1927, and 576,000 in 1926.

While horses are not used in as great numbers for farm work as formerly, it has been demonstrated in the non-irrigated sections of the state that the cost of wheat production can be lowered by using more horses per team. On small farms where tractors are not practical, horses are still in demand.

At the present time there are thousands of unclaimed horses on the ranges, which, on account of their numbers, are seriously depleting the grazing section. A recent session of the state legislature passed a law providing for the roundup of these horses, upon proper petition by the taxpayers of the county, and subsequent sale or slaughter. This condition has prompted the establishment of a canning factory in Butte where horses are slaughtered and the meat packed for export trade.

The value of horses marketed last year was $267,000, as compared to $265,000 in 1926, and $1,320,000 in 1925.

MULES.

Comparatively few mules are raised or used in Montana. The ease with which range horses are raised has had a tendency to curtail the increase in mules.

In 1870 there were 500 mules in the state. Fifty years later there were only 9,000 and on January 1, 1928, there were 11,000, this latter estimate being the same for the last four years.

"THE RICHEST HILL ON EA

"THE RICHEST HILL ON EARTH"—A view of Butte, Montana, the greatest mining camp in the world, where over 100 shafts pierce the hill which has yielded more than two billion dollars in gold, silver, copper, zinc and lead—three-quarters of this sum, however, having been left in the form of wages, freight and supplies. Fifteen thousand tons of ore, produced by 10,000 miners, are hoisted to the surface from these mines each day. See text for description

The World's Largest Wheat Farm Operated by the Campbell Farming Corporation, in Big Horn County, Montana This company has 95,000 acres of land, 65,000 acres are plowed. The company owns 56 tractors, representing 3000 horsepower, 500 fourteen foot plow bottoms, 60 twelve foot drills, 50 ten foot discs, 22 binders, 100 [illegible] 21 combines, and 200 wagons At this huge modern farm 1000 acres per day can be plowed, 2000 acres can be seeded, and the same area can be harvested in a single day. Thirty thousand bushels of wheat have been threshed in twelve hours. The photographs, shown above, illustrate the operations in part. (1) Part of a 10,000 acre wheat field raised on fifteen inches of rainfall by the summer fallow method. (2) Plowing 640 acres in one day on furrow four miles long. (3) A few of the 21 combines in operation. With the new method of windrows the combine can be used in any climate, Mr. Campbell avers, at a saving of from two to three dollars per acre. (4) The new method of harvesting wheat in windrows, 40 feet wide, and combine thresher. (5) Harvesting a 7,000 acre field of flax, using the new method of harvesting, and threshing with a combine. Mr. Campbell estimates that this method reduces the cost of harvesting flax from three to four dollars per acre. In harvesting operations, labor, twine and shocking is saved. (6) Steel storage bins, capacity 1000 bushels each, and caterpillar pulling a wagon train. The standard wheat train on this farm has an average load of 2,000 bushels. It is hauled at three miles per hour. The company has storage capacity in bins and warehouses for 150,000 bushels. (See text.)

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The company has storage capacity in bins and warehouses for 150,000

LIVESTOCK SANITARY BOARD

State Has Largest Modified Tuberculosis Free Accredited Area in Country and Largest Accredited Herd.

By Dr. J. W. Butler.

The Montana Livestock Sanitary Board is commissioned with the duty of eradicating, preventing and controlling diseases of livestock. It is also the duty of the Livestock Sanitary Board to promulgate and enforce rules, regulations and orders for the proper supervision, inspection and control of slaughter houses, meat depots, meat and meat food products, dairies, milk depots, milk and its by-products, barns and dairy cows. It is also their duty to tuberculin test all dairy cattle. In all work the Livestock Sanitary Board cooperates with the United States Bureau of Animal Industry under a written working agreement.

All official work done by the Montana Livestock Sanitary Board is done free of charge to the owner or agent of the livestock when such owner or agent of the livestock has observed the regulations of the Livestock Sanitary Board.

In the organization of the Livestock Sanitary Board corps, the state is divided into eight districts, with a district deputy state veterinary surgeon in charge of the work in his particular district. These district deputy state veterinary surgeons are all-time salaried employes of the Board. In addition to the district deputy state veterinary surgeons various veterinarians throughout the State are commissioned as resident deputy state veterinary surgeons. They are practicing veterinarians who do not receive a regular salary, but are employed in emergencies on a per diem basis. They have the same legal authority as the State Veterinary Surgeon or district deputy state veterinary surgeons when officially employed by the Livestock Sanitary Board.

The Livestock Sanitary Board also maintains a laboratory at Helena, where diseased tissues forwarded to the laboratory are examined microscopically and pathologically. There is also maintained a chemical laboratory, where milk samples, stock food samples, stomach contents and water for stock purposes are chemically analyzed from time to time.

Reports of disease in livestock are investigated immediately, and the necessary action taken to eradicate that disease and prevent its spread. All imported sheep are inspected and quarantined, and re-inspected before being released from quarantine. Imported pure bred and dairy cattle, and other cattle when considered necessary, are quarantined subject to a 60-90 day tuberculin retest.

Under the cooperative agreement with the United States Bureau of Animal Industry, certain districts and counties are quarantined against the importation of untested cattle, and all cattle in these districts or counties tuberculin tested, so that these districts or counties may be designated by the United States Bureau of Animal Industry as modified tuberculosis free accredited areas. At the present time there are five modified accredited counties in Montana (Sheridan, Daniels, Ravalli, Missoula and Mineral), and work is in progress to accredit Lincoln, Flathead, Sanders and Lake counties. When these counties are finished, which we expect will be early this year, taken into consideration with the adjoining counties of Missoula, Mineral and Ravalli, they will form the largest single modified tuberculosis free accredited area in the country.

We also have the largest accredited herd in the United States. This herd is composed of over 2,600 pure bred animals, kept and handled in strict accordance with the rules and regulations promulgated by the United State Bureau of Animal Industry and the State of Montana governing accredited herds.

It is the policy of the Montana Livestock Sanitary Board to assist in every way possible the stock growing industry of the state. That the work performed by the Livestock Sanitary Board has been of service to the State of Montana is evidenced by the fact that we have one of the lowest percentages of tuberculosis in livestock of any state in the United States, and that sheep scab does not now exist in Montana, and has not existed in the state for over ten years.

Cattle scab is confined to a few isolated areas. The dread disease, hydrophobia or rabies, is not known to exist in the state, and neither has the very fatal disease anthrax been reported for several years past. Under range conditions intestinal parasites of our various livestock are a rarity. Hog cholera is not a prevalent disease. During the year 1927 hog cholera made its appearance in only twenty-one small herds in the State. Glanders and dourine in our horses has practically been eradicated, there only being an occasional case reported from year to year.

The Montana stockmen loyally support the Livestock Sanitary Board. So much so that the stockmen themselves built and equipped the Livestock Building on the Capitol grounds at Helena. In a state the size of Montana the loyal support of the stock industry, and their confidence in their Livestock Sanitary Board, is responsible for the successful carrying out of the duties of the Livestock Sanitary Board.

CLASSIFICATION OF MONTANA LIVESTOCK JANUARY 1, 1870-1928

YEAR	Milk Cows	Other Cattle	All Cattle	Horses	Sheep	Swine	Mules
1870	12,400†	24,000†	36,400	5,300†	2,000†	2,600†	500†
1880	11,500†	162,000†	173,500	36,000†	185,000†	10,500†	900†
1883	14,000	590,000	604,000	39,900	405,000	17,000	900
1884	14,200	672,000	686,800	45,900	466,000	17,500	1,000
1885	23,000	615,000	638,000	105,000	625,000	19,000	2,800
1886	25,300	725,700	751,000	120,700	719,000	19,000	8,900
1887	29,000	812,800	841,800	129,000	755,000	20,000	9,200
1888	31,000	934,500	965,500	187,000	1,265,000	22,000	5,500
1889	31,400	962,600	993,900	200,000	1,391,000	23,000	5,300
1890	33,000	981,800	1,014,800	216,000	1,990,000	29,000	2,400
1891	34,000	932,700	966,700	152,000	2,089,000	35,000	1,800
1892	35,700	1,026,000	1,061,700	197,000	2,089,000	35,000	1,200
1893	36,400	1,036,000	1,072,400	207,000	2,528,000	39,000	1,200
1894	36,400	1,057,000	1,093,000	197,000	2,781,000	39,000	900
1895	39,000	1,078,000	1,117,000	198,000	2,809,000	46,000	900
1896	42,000	1,154,000	1,196,000	183,000	3,061,000	52,000	900
1897	43,000	1,177,000	1,220,000	175,000	3,123,000	51,000	900
1898	42,700	1,082,000	1,510,000	171,800	3,248,000	47,000	900
1899	44,000	953,000	997,000	165,000	3,378,000	42,300	1,000
1900	48,500†	926,500†	975,000†	347,000†	6,170,000†	50,000†	2,800†
1901	49,400	960,200	1,009,600	302,000	6,417,000	47,000	3,400
1902	50,000	998,000	1,048,000	275,000	5,081,000	49,000	3,400
1903	52,400	1,048,000	1,101,000	246,600	5,120,000	51,700	3,400
1904	53,900	1,059,000	1,112,900	244,000	5,270,000	54,800	3,400
1905	55,000	1,048,000	1,103,000	236,800	5,639,000	57,600	3,400
1906	61,600	965,000	1,026,000	239,000	5,752,000	59,900	3,600
1907	66,000	916,300	982,300	292,000	5,637,000	62,900	4,000
1908	69,000	879,000	948,000	292,000	5,524,000	66,000	4,000
1909	75,000	905,000	980,000	304,000	5,634,000	68,000	5,000
1910	80,000	842,000	922,000	319,000	5,747,000	75,000	5,000
1911	80,000*	818,000*	898,000	344,000	5,230,000*	124,000	4,500*
1912	91,000	732,000	823,000	350,000*	4,926,000*	145,000*	5,000*
1913	95,000	950,000*	845,000	385,000*	4,675,000*	168,000*	5,500*
1914	104,000	826,000*	930,000	440,000*	3,850,000*	187,000*	6,000*
1915	114,000	836,000*	950,000	485,000*	3,340,000*	245,000*	6,500*
1916	125,000*	1,035,000*	1,170,000	520,000*	3,020,000*	270,000*	7,000*
1917	140,000*	1,114,000*	1,254,000	580,000*	2,670,000*	260,000*	7,500*
1918	150,000*	1,310,000*	1,460,000	640,000*	2,380,000*	202,000*	8,500*
1919	163,000*	1,447,000*	1,610,000	720,000*	2,530,000*	180,000*	9,000*
1920	178,000	1,192,000	1,370,000	669,000	2,450,000	167,000	9,000
1921	181,000	1,088,000	1,269,000	669,000	2,328,000	160,000	9,000
1922	185,000	1,195,000	1,380,000	650,000	2,561,000	180,000	10,000
1923	192,000	1,168,000	1,360,000	643,000	2,408,000	225,000	10,000
1924	209,000	1,151,000	1,360,000	611,000	2,480,000	292,000	11,000
1925	223,000	1,117,000	1,340,000	596,000	2,579,000	280,000	11,000
1926	225,000	1,055,000	1,280,000	576,000	2,880,000	250,000	11,000
1927	216,000	936,000	1,152,000	547,000	3,053,000	240,000	11,000
1928	209,000	908,000	1,117,000	536,000	3,206,000	264,000	11,000

NOTE: Many earlier estimates were made to exact figures. In the above table figures have been rounded to even thousands or even hundreds.

† Based upon Census Data.

* Tentative Revisions. All other figures are United States Department of Agriculture Estimates.

POULTRY

Industry Shows Steady Expansion—Better Methods of Grading and Marketing Bring Results—Turkey Industry Worth More Than Half a Million Dollars.

Estimates place the number of chickens on Montana farms at over 2,700,000 the average flock numbering close to 100. About 13,400,000 dozen eggs are produced annually which together with the sales of chickens return to the farmer some $3,334,000. The estimated total income from poultry sources was $4,188,000 in 1927, a slight decrease from the estimated income in 1926 of $4,221,000 but greater than the income for either 1924 or 1925.

Montana poultry raisers realize the value of breeding a standard variety of bird and while almost any type can be found in the State if one looks long enough, most of the poultry population falls into one of the following breeds: S. C. White Leghorns, Barred Plymouth Rocks, White Plymouth Rocks, S. C. and R. C. Rhode Island Reds, White Wyandottes, and Buff Orpingtons. In these classes we find members of outstanding American strains; for example, many fine Tancred flocks of Leghorns are reared in the State, several well-bred flocks of Martin's Regal Dorcas White Wyandottes, and so on.

With the exception of certain areas where specialized egg production is possible, such as the western district, the Huntley Project and certain smaller irrigated section, the problems of poultry production in the state are fairly uniform in all districts. Progress is being made in improved housing and feeding methods and in grading and marketing eggs. In every district there are those who find table egg production profitable. The successful producers invariably use approved methods of feeding, housing and management and grade eggs before marketing, thus assuring a fairly constant year-round supply and top prices. With such practices they are able to compete with the cooperative egg marketing associations of the Pacific coast which annually ship many carloads of eggs to the state.

THE TURKEY INDUSTRY.

The last seven years have witnessed a heavy expansion of the turkey industry. There has been an abrupt rise in turkey population from about 29,400 in 1920 to over 140,000 in 1927. Montana turkeys bring good prices and often command a premium for the high quality resulting from favorable climate and the superior feeds used in the state. The value of turkeys sold in the state last year is thought to have exceeded $500,000.

Among obstacles which have to be overcome by Montana turkey raisers is loss of birds through depredations of coyotes. In spite of every obstacle, however, the industry is steadily on the increase and because of climatic conditions, Montana's poultry will always stand with the best.

The state poultry breeders' association annually sponsors a poultry show, in the interests of the industry. Talks and discussions especially helpful to Montana growers are part of the program which also includes demonstrations by specialists and extension workers.

ESTIMATED SALES OF POULTRY AND POULTRY PRODUCTS

YEAR	Chickens & Eggs	Other Poultry	Total
1924	$2,926,000	$718,000	$3,644,000
1925	3,240,000	819,000	4,059,000
1926	3,360,000	861,000	4,221,000
1927	3,334,000	854,000	4,188,000

FUR FARMING IN MONTANA

Thirty-Seven Counties Have Fur Farms—Industry Expanding—State Should Be Producing Ten Per Cent of Country's Fur.

The first commercial wealth produced in Montana was taken out in the form of pelts by pioneer trappers and traders, the first white men to visit the territory. The same form of wealth is now being produced in pens and runways on at least 100 fur farms in thirty-seven counties. There are thousands of suitable locations for fur farming in the state and the number of farms should within a few years run into the thousands. Standing first in area of forest reserves, this state should lead the nation in fur production.

Records of pelt shipments from fur-bearing animals in 1927, as compiled by the state fish and game department, show a total of about 130,000 and include 111,762 muskrat, 4,487 mink, 735 fox, 585 raccoon, 63 otter and 9,222 beaver.

Looking at these present day figures and comparing them with those which show the prominence of Montana in the fur business when the trade was young and when the raw materials were a part of the natural resources of the country, it is easily seen that Montana has been needlessly falling behind in a branch of industry to which she has always been eminently fitted by nature.

Fur Farms.

That the natural existing supply of furs can be supplemented by successful raising of fur animals in captivity has been proved in Montana, though the industry is yet in its infancy, our 100 fur farms comparing with over 300 in Alaska and 2,000 in Canada.

The number of fur farms in the State, however, has more than doubled in the last three years. An interesting fact about the farms is that they are scattered in 37 of the 56 counties of the State. Flathead leads with 15 fur farms, Yellowstone has seven, Lake has six, Carbon and Gallatin five each. Other counties having more than two farms are: Missoula, Sanders, Stillwater, Park, Lincoln, Deer Lodge, Ravalli and Broadwater.

Some of the farms have been quite successful. One near Kalispell is an example. Started from a small beginning a few years ago, the ranch now not only breeds and raises silver foxes but also takes fox pups from Alaska breeders for finishing off, as the Montana climate is known to produce the finest quality fur. Another is said to be the largest muskrat farm under fence in the United States. Five acres are fenced near Swan Lake in Lake county and more than 100 experimental pens have been constructed. It is expected that within a short time the ranch will produce 20,000 to 30,000 pelts annually. A farm in Yellowstone county raises skunks, otter, raccoon, possum, mink and muskrat. An account of this farm says: "furs shipped from this section of the country command a higher price as a rule than those from other states, climatic conditions being especially good for the production of high quality fur."

A farm in Mineral county has domesticated lynx, and one in Missoula county now has about 600 foxes. A ranch in Cascade county has purchased 1,000 pair of muskrats, while one north of Corvallis in the Bitter Root raises Karakul sheep, the bearers of luxurious Persian lamb fur which commands the highest prices for trimming wearing apparel, besides black foxes, skunk, raccoon and muskrat.

Demonstrating shifts in the fur industry, it is pointed out that the lowly jack rabbit probably contributed more to state income in Montana last year than any other fur animal with the exception of the muskrat. During the winter of 1926-27 one firm alone took 58,498 rabbit skins out of Montana. Practically all of these skins were jack rabbit skins. The skins of the white rabbit, properly stretched and dried brought 60 cents a pound, or about 17 cents each, the gray rabbit skins, 40 cents per pound. The rabbits are of some value as food and game, and their flesh is sometimes fed to poultry. Chinchilla rabbits are now raised in almost every county in the state.

As indicative of what may be accomplished in fur farming, the owner of a farm in Wisconsin was recently offered $8,000,000 for his establishment, which offer was declined, according to the official magazine of the Chicago, Milwaukee, St. Paul and Pacific railway company. This farm, it is expected, will have on hand this year about 15,000 foxes and will turn off upwards of 10,000 pelts per year. The breeding stock is valued at from $1,000 to $5,000 and $6,000 a pair.

According to the Year Book of the United States Department of Agriculture, there are about 4,000 fur farms in the United States and Canada, most of them raising silver or blue foxes. There is ample basis for a sound industry in this state and newcomers are encouraged for its desirability both in the utilization of non-agricultural land, and in the production of valuable crops of fur. The Federal Department estimates the total investment in the country at about $30,000,000.

The fur trade of the United States is estimated to be worth over $175,000,000 annually. Montana probably does not contribute one per cent. Fur sales now in the United States and Canada dispose of over 100,000,000 pelts a year, counting rabbit, mole and muskrat. In the past three years not over 150,000 pelts have been shipped from Montana, though the State is capable of producing ten per cent of the nation's fur, as well as ten per cent of her wool and wheat and, with the development of the modern fur farm, may, in the next decade or so reach this return.

MONTANA DAIRY INDUSTRY IN 1927

By B. F. Thrailkill.

The manufacture of butter in Montana has increased from 14,178,938 pounds in the year 1924 to 16,534,892 pounds in 1927. The manufacture of cheese in 1924 was 934,065 pounds and in 1927 was 1,556,539 pounds, while the manufacture of ice cream increased from 564,676 gallons in 1924 to 741,804 gallons in 1927. Converted into the equivalent of whole milk sold by farmers for manufacture in the state the year 1924 shows 356,157,900 pounds of whole milk sold for manufacture against 419,956,000 pounds so sold and processed in 1927.

These figures alone would indicate the substantial gain in importance of the dairy industry in the state during the past four years although the gain in manufactured dairy products does not necessarily mean that there has been a corresponding increase in the total production of milk, since the proportion of the total milk produced that is sold for manufacture may vary from year to year.

Reliable statistics relative to dairy production beyond the statistics of manufacture and shipments which are actual records are difficult to obtain except in form of estimates. On the other hand it is essential that all possible statistics relative to dairy production be assembled if we are to intelligently analyze and evaluate its development. With this thought in mind the state dairy division has been cooperating with the state-federal crop and livestock estimating service with a view of securing the best possible estimates relative to dairy production.

MANUFACTURED DAIRY PRODUCTS

(From records of the state dairy division)

	1924	1925	1926	1927
Butter, lbs.	14,178,938	14,807,836	16,230,062	16,534,892
Cheese, lbs.	934,065	1,561,027	1,810,053	1,556,539
Ice Cream, gals.	564,676	761,638	672,724	741,804

SHIPMENTS OF MONTANA BUTTER TO CALIFORNIA MARKETS IN PAST FOUR YEARS

MARKET	Butter lbs. 1924	Butter lbs. 1925	Butter lbs. 1926	Butter lbs. 1927
Los Angeles	.....	.....	1,934,838	1,047,534
San Francisco	770,000	1,896,000	2,331,098	2,172,866
Total	770,000	1,896,000	4,265,936	3,220,400

ESTIMATES OF DAIRY PRODUCTION 1927

Total estimated production of Montana dairymen in 1927 as estimated jointly by the state dairy division and the state-federal crop reporting service was the equivalent of 19,881,700 pounds of butterfat compared with 20,235,400 pounds revised estimate of 1926; 21,628,000 pounds in 1925 and 20,784,000 pounds in 1924. Estimated farm value of this production was $9,364,000 in 1927 compared with $9,065,000 in 1926; $8,603,000 in 1925 and $7,282,000 in 1924.

FOREST RESOURCES*

Timber Stand of Fifty Billion Feet—Resources Will Stand Present Rate Cutting Forever.

The forests of Montana form one of the state's greatest natural resources. More than 20,000,000 acres of the state's total area of 94,000,000 acres are classified as forest land. Timber of commercial size and quality is found on over 8,000,000 acres; more than 7,000,000 acres are cut-over, burned or young growth, and almost 5,000,000 acres are classed as protection or scrub forests situated either on the poorer sites at lower elevations or inaccessible at the higher altitudes.

Lumbering ranks first in total value of finished products among manufacturing industries of Montana and second in number of persons employed, employing nearly 7,000 of the state's population.

Forests play an important part in the industrial life and general welfare of the people. Many communities of the state are almost entirely dependent upon the lumber industry for prosperity and although people living in non-forested areas receive no direct benefit from the lumbering industry, they are able to save considerable on the price of lumber which would result from increased freight rates from more distant points.

Forests have a marked influence on the equalizing of stream-flow, tending to prevent floods and erosion, and are, therefore, of direct benefit in both irrigation and water-power development, as most of the great streams of the state rise in the mountains. They are a home for fish, game and fur-bearing animals and form an important source of recreation for an ever-increasing number of people.

Timber Stands.

Of Montana's total stand of approximately 50 million board feet, about 75 per cent, or 37,492 million board feet, is found in nine western counties of the state. Of the total stand about 20 per cent is western yellow pine, about 40 per cent western larch and Douglas fir, the remainder largely lodgepole pine, Idaho white pine, cedar, hemlock, white and alpine fir, and spruce. About 27 per cent of all timber in the state is controlled by private individuals or companies, about four per cent is owned by the state, and the balance is in different federal holdings. Of timber privately owned, about 40 per cent is at present accessible, about 30 per cent indefinitely inaccessible, and of timber publicly owned less than 20 per cent could be profitably logged at this time, and about 50 per cent will remain indefinitely inaccessible.

The Annual Cut.

The average annual lumber cut in Montana is about 341,555,000 board feet; the total of all forest products, including mine timbers, ties, poles and miscellaneous material averages about 480,240,000 board feet. Statistics show that during the 21-year period of 1870 to 1914 approximately 6,610,925 thousand feet of lumber were produced in Montana, production increasing from 12,571 thousand feet in 1870 to 351,403 thousand feet in 1914. Fifty-five per cent of the lumber

*Data by State and Federal Forest Services.

TODAY

Today Montana ranks first among all states in area of United States Forest Service lands, fourth in stumpage remaining on national forests and twenty-fifth in value of lumber output.

Her lumber industry employs almost 7000 persons with an annual payroll of over $8,500,000.

Twenty million acres of Montana's total area of 94,000,000 acres is forest land.

Montana's total annual consumption of all forest products amounts to approximately 517,040,000 feet, 85 per cent of which is produced within the state.

Total annual exports for all forest products amount to about 184,950,000 feet.

Approximately 37,492 thousand feet of the state's total stand of 50 million feet and about 97 per cent of the total commercial cut is found in nine western counties of Montana.

Lumbering ranks first in total value of finished products in Montana, the total value of the average annual cut, including value added by manufacturing, amounting to about $14,350,000.

The average annual lumber cut is about 341,555,000 feet.

The state owns over 500,000 acres of forest land, the annual cut from state forests averaging about 30 million feet and contributing approximately $500,000 to the industrial wealth of Montana.

cut and 64 per cent of all forest products came from private holdings, the rest being divided between state forests, national forests and other federal lands, mainly Indian reservations. The estimated value of the average annual cut, including value added by manufacturing, is $14,350,000. Not only the greater part of the $4,650,000, original value of the lumber, remains within the state, but also most of the $9,700,000 added by manufacturing, and representing money spent for labor, equipment, taxes, logs, stumpage and profit, remains to add to the state's general prosperity. It is estimated that for every thousand feet of forest products produced, about $20 is spent locally for labor and supplies, the industry thus creating almost $10,000,000 of local business.

Capital Invested.

The census shows that there are within the state 246 mills, of which 150 are active and although the total average annual cut is about 350 million feet, the maximum annual capacity of Montana sawmills, on the basis of an eight-hour shift, is reported to be over 500 million feet. Lumbering industries represent a capital value of $50,000,000, about $25,000,000 being invested in manufacturing plants, lumber yards, etc., and an equal amount invested in private timber lands and stumpage. These industries contribute almost three-quarters of a million dollars annually through city, county and state taxes, and employ about 6,700 men, the annual payroll amounting to over $8,500,000.

Retail Dealers.

There are about 315 retail lumber dealers in Montana distributing over 60 per cent of all lumber consumed annually within the state. Of the two largest retailers in the state, one owns 46 yards, the other 19 yards, although but seven towns in the state support more than three retail establishments. Estimates show that the total annual production of all forest products in Montana is approximately 517,040,000 feet.

Consumption Forest Products.

The state's total annual consumption of all forest products averages about 386,445,000 feet; over 85 per cent of which, or 331,970,000 feet, is produced within the state; about 13 per cent, or 54,475,000 feet, imported from Washington and Idaho, and about 2,240,000 feet, mainly hard woods, imported from the southern and lake states. Annual consumption of mine timbers alone amounts to approximately 89,000,000 feet, Butte, the largest copper mining city of the world, being the chief consumer. Fifty-seven per cent of lumber produced, excluding sawed ties and mine timbers is exported. Total exports for all forest products amounts to approximately 184,950,000 feet annually. Lumber forms one of the very large factors in the freight transportation business of the railroads, amounting to over $5,000,000 annually, and balancing a considerable portion of the state's bills for goods imported.

Present Rate of Cutting Not Excessive.

While there are no accurate figures as to the amount of timber the forests can produce annually on a sustained yield basis, it seems safe to say that with the thought and effort that is being put into protection and management, they should be able to continue to produce at the present rate of cutting, or approximately 500,000,000 feet a year, or at the rate of about 35 board feet per acre per year. In many of the older states where lumber was cut too fast for growth replacement, forest areas were practically exhausted, towns and communities deserted, due to the migration of the lumber industry, resulting in serious economic

YESTERDAY

The first lumber mill in Montana is said to have been established by A. M. Holter in 1863 on the bank of the Ruby river, in what is now Madison county.

It was a second hand mill, purchased in Denver, and hauled by a team of oxen for the entire 1000 mile journey. Obstacles overcome were tremendous; including a hold-up by George Ives, the notorious bandit, and the transfer of the machinery to a handsled when crossing the snow covered mountain grades.

The mill was primitive. It was operated by a 16-foot overshot water wheel. The blacksmith bellows were made out of old army coats, shafting was fashioned from iron wagon axles and belting from untanned ox hides.

But the mill worked and sawed 5000 feet of lumber the first year. It was a vast improvement over "whipsawing" with hand tools.

This was the foundation of Montana's great lumber industry and to A. M. Holter goes the honor of being the Treasure State's first successful lumberman.

losses to the state. It is gratifying to think that Montana has not so far cut her forests at a rate which has resulted in a depletion of the supply.

Montana State Forests.

Montana owns more than half a million acres of state forest lands. They are comprised in seven state forests and many isolated state forest sections scattered throughout the state.

Stillwater State Forest	90,000 acres
Swan River State Forest	42,000 acres
Coal Creek State Forest	20,000 acres
Sula State Forest	10,000 acres
Thompson River State Forest	14,628 acres
Clearwater State Forest	18,076 acres
Lincoln State Forest	8,245 acres
Total of Established State Forests	203,949 acres
Forests Sections Scattered Throughout State	363,000 acres
	566,949 acres

State forest lands were originally widely scattered and it is the policy to consolidate holdings by sale or exchange of state forest sections for forest areas contiguous or adjacent to any of the above named seven forests. Since the state has definitely adopted a policy of state forest ownership, it has been necessary to enact constructive legislation for the use, management, control and disposition of the state forests. The act of the legislature of March 17, 1925, provides a substantial foundation for state forest management.

State lands that are classified as forest lands and "which are principally valuable for the timber that is on them, or for the growing of timber, or for water-shed protection, are designated as state forests, and reserved for forest production and water-shed protection."

State Forest Lands Not for Sale.

While the state forest lands are not for sale, products of the state forests, consisting chiefly of timber and forage, are for sale. Although this provision of the law is very recent, state forests now serve 68 permittees, whose chief business is grazing. There are 50 large timber sales involving 87,000,000 feet located in five of the chief water-sheds of the state. State forests furnish timber in small sales at nominal cost to 249 settlers and residents. The receipts from Montana's state forests go entirely to the common schools and other educational institutions of the state.

Out of the 50 large sales now in operation, seven are to firms and lumber companies that are wholly dependent on state forest timber for their supply of logs. The balance of the operators are only partially dependent upon the state forests for their timber supply.

State Forests Contribute to Industries.

The annual timber cut from state forests averages about 30,000,000 feet, furnishing employment for the entire year to at least 300 laborers and contributing over $500,000 a year to the industrial wealth of the state. Receipts from stumpage on sales of timber that go to educational institutions of the state amount to approximately $100,000 annually. Timber sale receipts from state forests, which have gone largely to the support of educational institutions, have aggregated over $1,000,000 in the period from 1891 to 1925.

Seven State Forests Self-Supporting.

The seven state forests are already self-supporting and comprise some of the most natural, as well as accessible, recreational centers of the state. The Lincoln and Clearwater state forests embrace a large part of the Big Blackfoot River and are important centers of recreation for the cities of Helena, Butte, Great Falls and Missoula. The Stillwater, Coal Creek and Swan River Forests are among the chief centers for Kalispell and Missoula. All of these state forests abound in game and fish and it is safe to estimate that they are visited by thousands of Montana's citizens each year as well as by many tourists.

LOADING ON CARS AT RAILROAD, MINERAL COUNTY

National Forests.

There are 17 national forests in the state. The national forests were created under acts of Congress authorizing the withdrawel of public lands for the protection of stream-flow and the production of timber. They are, therefore, the common property of all the people, are directly in charge of the Forest Service, with headquarters at Washington, D. C., and are administered by the Department of Agriculture. National forests of the United States are divided into eight districts, the 17 national forests of Montana, and seven national forests of Idaho comprising District No. 1 which is under the supervision of the district forester with headquarters at Missoula. Each forest is in charge of a supervisor located wherever most convenient for the administration of his forest. The forest itself is then sub-divided into districts, each district in charge of a forest ranger who handles timber sales, fire protection, grazing and similar work.

Over Fifteen Million Acres in National Forests.

Of the total area of 15,882,000 acres of land within the National forest belt, 5,313,000 acres contain timber of commercial size and quality; 5,559,000 acres are young growth, cut-over, or burned lands; 2,403,000 acres are protection or scrub growth, and 2,607,000 acres are barren or mountain grass lands. The forests are situated almost entirely in the mountainous, or western and southern portions of the state with the exception of the Custer Forest located on the elevated mesas and buttes of southeastern Montana and extending from the Tongue River eastward into South Dakota. The main headwaters of the Clark's Fork of the Columbia, the Missouri and the Yellowstone Rivers are within the forests. National forests are so situated as to form a direct factor in the welfare of the people of over half of the entire state, and comprising more than two-thirds of the state's population.

Forest Rangers.

The protection of the forests from fire and the control of fires constitute the ranger's most important work. The control of fires is sometimes difficult especially in the extreme western part of the state where the forests are dense, underbrush heavy, seasons sometimes very dry, humidity low, resulting in extremely dry, highly inflammable material on the forest floors, where lightning storms, accompanied by little or no rain, are frequent, and fires occasionally get beyond control as in the seasons of 1910 and 1919, when large areas both within and outside of the national forests were burned over. With the gradual development of the Forest Service, and similar systems used on state and private lands, fire losses should in time become less colossal.

Large Per Cent Fires Man Caused.

The average annual fire loss amounts to 81,112 acres of forest, or 153,000,000 feet of timber destroyed, 80 per cent of the destruction being in western Montana. In the sixteen-year period, 1908 to 1924, 3,329,000 acres of forest land were burned over causing losses conservatively estimated at $10,462,000 with an additional cost for fighting fires of $3 533,000. Of the total of 11,214 fires in this period, 70 per cent, or 7,895, were man caused; the remainder caused by lightning. Man caused fires are generally preventable, being almost wholly due to carelessness or ignorance and in violation of state laws. Public sentiment is strongly opposed to the careless use of fires in the forest and the courts have punished many violators of forest-fire laws in the last few years.

Timber Cut Limited.

So that forest capacity may not be reduced, cutting of timber on national forests is limited to growth replacement and is restricted to mature timber or to thinnings that will result in increased growth or improvement of the stands. The present limitation of timber cut upon publicly owned forest lands is 258,000,000 feet in western Montana, 124,500,000 feet in eastern Montana. Timber is sold commercially to the highest bidder. Each tree is marked for cutting by the forest officer, and the logs scaled or pieces counted so that the purchaser pays for the exact amount of timber he receives. Sales are made to ranchers for their own use at cost of administration. As rapidly as possible forests are being divided into working circles, estimates of each are made of the stand and annual

growth; limitation of cut fixed, and an effort made to place the timber on a sustained yield equal to producing capacity so that permanent communities based on the lumber industry will be established and maintained, and forest lands kept in the highest state of production.

Grazing of Livestock.

Although grazing of stock is not one of the original purposes for which national forests were created it has become one of the most important uses of the forests. All stock is grazed under permit with the exception of a few head of work horses and milk cows grazed free by actual settlers and in 1925, in Montana, 155,950 cattle and horses, 564,558 head of sheep were grazed in national forests, receipts from fees required amounting to $133,785; 25 per cent of which was paid to the state to be used for roads and schools in counties in which these forests were situated.

Division of Range.

Division of the range between sheep and cattle generally depends upon the character of the range and the needs of the owners, preference being given to prior users and to persons owning and residing on improved ranch property in or near the forests and dependent upon the forests for range. Sheep are grazed in bands and each permittee allotted a definite range within which he may handle his stock. It is customary for cattlemen to cooperate in grazing and management of their stock, cattle usually being allowed to graze at will within certain limits and controlled by natural boundaries or drift fences, by salting and systematic riding of the range. An attempt is made to prevent over grazing, which is the cause of not only reduction in grazing capacity but often of destructive erosion. Where necessary to restrict grazing because of need of water-shed protection or use of the forests for wild game and recreation, the decision is made on a basis of the highest use of the greatest public benefit. Grazing fees are based on the following conditions:

1. The proper use of the grazing resources to best serve the public interest.
2. Reasonable consideration of the value of forage to the livestock industry.
3. The effect of the rates upon livestock producers.

ARTIFICIAL REFORESTRATION.

Where a forest area is burnt over but once, artificial reforestration is seldom necessary, as a single burn is not ordinarily sufficient to destroy all seed and the land will reseed naturally. But where a second burn occurs before the young trees are old enough to bear seed and where the area burnt is so great that seed will not be scattered from surrounding forests, reforestration through artificial means becomes necessary. Methods of direct seeding have been found impracticable. The transplanting of young trees, about three years old, from nurseries into the forests has been successful, results showing a survival of from 70 to 90 per cent of transplants. The largest Forest Service nursery in the United States is the Savenac nursery at Haugan, Montana, which produces about 3,000,000 transplants annually, sufficient to plant about 4,000 acres, and supplies the national forests of Idaho as well as Montana. Reforestration costs approximately $10 per acre and through fire control, which is the most important part of forest management, could be greatly reduced if not avoided entirely.

NATIONAL FORESTS OF MONTANA.

The following table shows the area in each county contained within a national forest, the receipts from timber sales for the year 1927 and the total receipts for the years 1908 to 1927 inclusive:

COUNTY	Present Area in National Forests (Acres)	Counties' Share Receipts from National Forests 1927	Counties' Share Receipts from National Forests 1908-27 inclusive
Beaverhead	1,398,746	$ 5,284.89	$ 120,573.79
Blaine	.....	.....	209.32
Broadwater	148,865	640.58	20,054.60
Carbon	302,417	1,099.66	29,926.63
Carter	88,445	1,003.69	12,520.87
Cascade	185,215	921.62	26,746.68
Chouteau	29,857	148.94	3,283.03
Custer	.....	.....	33,249.26
Deer Lodge	239,265	1,291.14	76,590.48
Fallon	.....	.....	4,313.47
Fergus	89,466	446.81	13,304.10
Flathead	1,704,603	1,835.24	115,178.13
Gallatin	590,545	3,711.87	59,960.92
Glacier	25,239	28.69	421.58
Golden Valley	23,617	117.80	659.71
Granite	656,908	1,086.38	50,224.46
Jefferson	447,549	2,293.12	99,359.86
Judith Basin	303,986	1,516.36	10,197.93
Lake	127,572	46.05	260.61
Lewis and Clark	809,955	1,552.64	55,315.08
Lincoln	1,657,332	2,345.88	138,887.68
Madison	778,113	8,447.03	124,094.50
Meagher	437,867	2,044.93	45,743.64
Mineral	582,551	423.25	47,737.52
Missoula	567,492	448.56	68,499.92
Musselshell	.....	.....	1,149.00
Park	791,270	2,308.39	48,736.09
Phillips	28,222	140.63	1,848.85
Pondera	121,616	138.36	2,026.17
Powder River	331,970	3,776.18	55,760.74
Powell	516,187	1,030.89	32,954.62
Ravalli	1,034,960	769.94	86,924.56
Rosebud	96,743	1,096.54	18,297.61
Sanders	822,314	2,293.34	34,879.44
Silver Bow	185,510	923.46	43,041.14
Stillwater	199,404	725.19	8,649.16
Sweet Grass	276,402	818.36	26,698.84
Teton	249,896	284.27	19,126.76
Wheatland	58,231	282.22	3,044.94
Total	15,908,330	$51,322.90	$1,540,451.69

Montana has 17 national forests within her boundaries; name of each forest, net area and headquarters of supervisor are given below:

Forest	Headquarters	Net Area
Absaroka	Livingston	841,086 acres
Beartooth	Billings	659,919 acres
Beaverhead	Dillon	1,339,273 acres
Bitter Root	Hamilton	1,047,071 acres
Blackfeet	Kalispell	836,967 acres
Cabinet	Thompson Falls	829,077 acres
Custer	Miles City	517,267 acres
Deer Lodge	Butte	829,158 acres
Flathead	Kalispell	1,721,478 acres
Gallatin	Bozeman	575,189 acres
Helena	Helena	681,291 acres
Jefferson	Great Falls	1,040,636 acres
Kootenai	Libby	1,331,513 acres
Lewis and Clark	Choteau	810,731 acres
Lolo	Missoula	850,677 acres
Madison	Sheridan	931,020 acres
Missoula	Missoula	1,030,257 acres

DOUGLAS FIR

Discovered in 1791 by Dr. Menzies of the Vancouver expedition, the tree was named pseudotsuga taxifolia, meaning a false hemlock with fir leaves, but is known by a number of other names, Douglas fir being the most generally accepted.

Leaves are flat, blunt, slightly grooved on top and vary from deep yellow to blue green in color. The bark of young trees is smooth and white, having numerous resin blisters, gradually becoming more scaly with age, eventually breaking into deeply furrowed ridges and growing from a light to dark gray-brown in shade.

In Montana, Douglas fir attains an average maximum age of 300 years, varies in maximum diameter from 16 inches to five feet, in height from 90 to 150 feet, and ranges in altitude from 1800 to 8,000 feet, often occurring on steep, dry slopes above the range of western yellow pine or on north aspects too poor and dry for western larch or white pine. Stand yields average from 7,000 to 30,000 board feet per acre. The tree obtains its best growth in a porous, well-drained soil but occurs under a variety of conditions, being moderate in its requirements as to either soil, moisture or light. In general trees bear seeds every season, the cones averaging about 44,000 seeds per pound and being quite distinct from any other species because of the three-pointed trident-like bracts which protrude from among the scales.

Gross weight of green lumber is approximately 34 pounds per cubic foot; of air dried, 31 pounds; of kiln dried, 29 pounds. It is classed as one of the most durable native woods in contact with soil or weather conditions and as one of the hardest to treat with a preservative because of the resistant quality of the heartwood. The wood varies from a light brown to a yellowish-red or reddish brown in color, is of rather coarse, uneven, knotty grain and splits easily but has a high value because of strength and durability.

DOUGLAS FIR

The total stand in Montana is estimated to be over 10 billion feet or nearly two per cent of the nation's total stand of 595 billion feet. The average annual cut is about 53,611 M. feet B. M. or 16% of the total cut for all species in the state, Douglas fir ranking third in Montana in total output of sawmills and value of products.

A large percentage of the lumber is used for concrete forms, girders, joists, rafters and as roof and barn boards, although used to some degree in furniture, agricultural implements, sporting and athletic goods and so on. Pulp is used to a limited extent in Pacific Coast paper mills. Experiments have shown that turpentine, tar, alcohol, acetate of lime and charcoal are some of the chemical products that can be derived through destructive distillation of slabs, edgings, culls and such.

WESTERN LARCH

Western larch or tamarack as it is most commonly known, though technically named larix occidentalis, was first discovered in 1806 along the Clearwater River in western Montana.

Foliage of this tree is shed every fall, is of a pale greenish-yellow, turning bright lemon-yellow in autumn. Leaves grow in bundles of from 14 to 30, are less than two inches long, rounded on the back with a distinct ridge on the inner surface. Bark of older trees is of a reddish-brown, is deeply furrowed for 20 or more feet and from three to six inches thick. On younger trees it is thin, scaly, and dark or gray-brown in color. The tree attains an average maximum height of 175 feet, an age of 400 years and a diameter of five feet or more. Yields per acre, in Montana, vary from 1,400 to about 21,900 board feet. It has an altitudinal range of from 2000 to 7000 feet, requires a moderate amount of moisture and plenty of light. Seed production begins at an age of about 50 or 60 years, occurs at intervals of five to six years and averages approximately 130,000 seeds per pound.

The wood is of a straight fine grain, varying from light to dark red brown in color, takes any finish readily, machines well; ranks first in nail holding ability, and is one of the strongest native woods because of its hardness, stiffness, and capability to resist shocks. In select grades, which average from about ten to 25 per cent of the usual run of logs, it is used to a large extent for flooring, the vertical grained being probably the best softwood available for that purpose, and also for interior finishing, mouldings, ceilings and the like. In the common grades, it is very generally used for crossties, wood-block paving, boxes and crates, posts and poles. Green lumber averages about 48 pounds per cubic foot; air-dried, 37 pounds and kiln-dried, 36 pounds. The wood is very durable where exposed to weather conditions and is also quite durable in contact with soil.

The total stand for the United States is over 23 billion feet, that for Montana is estimated to be more than nine billion feet or about 41 per cent of the total supply. The annual cut for the period of 1920 to 1924 was 119,577 M.

feet B. M. or 35 per cent of the state's total cut for all species. About 52.5 per cent of the total stand in Montana is in federal holdings; 40.9 per cent, privately owned, and 6 6 per cent owned by the state.

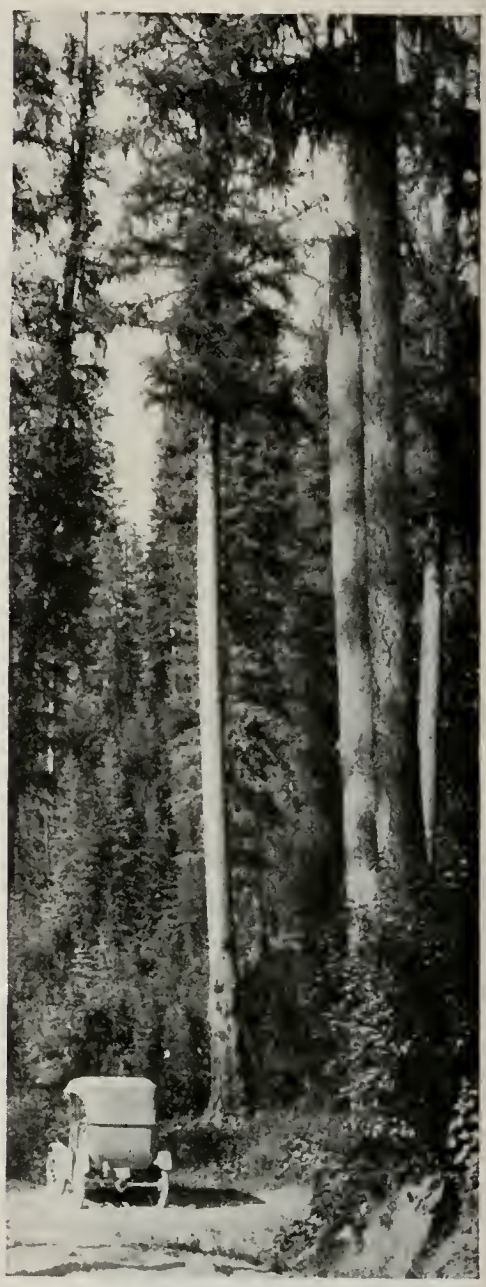
Paper pulp suitable to the making of kraft wrapping paper can be obtained through a sulphate process. Experiments show that about 33 gallons of ethyl alcohol, or 10 gallons more than from any other native species, can be derived from a ton of dry larch.

LODGEPOLE PINE

The high mountain form of lodge pole pine, or pinus murrayana, was supposedly discovered by the Lewis and Clark expedition in 1805. The coast form, or pinus contorta, was discovered by David Douglas in 1825 and was so named because of its dwarfed appearance.

Leaves are a bright yellow-green, short, wide and twisted, about two inches long and borne in bundles of two. The bark is thin and scaly, pale brown in color with a grayish tinge. The tree attains a maximum average age of about 250 years,

LODGEPOLE PINE



WESTERN LARCH

a height of 85 feet and diameter of about 20 inches. It occurs in almost pure stands, averages from 6,000 to 14,000 board feet per acre and has an altitudinal range of about 2,000 to 8,500 feet in Montana. Mature trees bear from 200 to 2,000 cones each, production beginning at from six to 20 years of age, and many cones remaining on the trees from 10 to 13 years. Seeds average about 115,000 to the pound.

Green lumber averages 39 pounds per cubic foot; air-dried, 29 pounds, and kiln-dried, 28 pounds. The wood is somewhat soft, of straight grain with narrow rings, easily worked, and takes paint readily.

The total stand for the United States is approximately 43 billion feet; for Montana 11 billion feet, or about 26 per cent of the nation's total, and about 86 per cent of which is in national forests, the remainder in other federal, state and private holdings. The average annual cut in Montana, from 1920 to 1924, was 4,924 M. feet B. M. Lodgepole pine averages but seven per cent select grades on account of numerous small

WESTERN WHITE PINE

knots, and about 93 per cent common. While contributing only one per cent of the total cut of all species in Montana, it is, nevertheless, one of the most important in regard to both total lumber cut and total value of output based on mining and farm timbers, poles, railroad ties and such, forming one of the main sources of lumber for the mining and agricultural industries in Montana. Total annual consumption, in Montana, of mine timber is approximately 17,500 M. feet B. M. and consumption of cordwood, about 20,000 M. feet.

Quantities of this pine were at one time made into charcoal by the pit-burning method, some charcoal still being produced near Bernice. The wood is suitable for paper pulp and will yield approximately 30 gallons of crude tar, or tar oil, per cord, although this yield is at present too low to compete favorably with that of the southern yellow pine or the by-products of the Lake states distillation industry.

WESTERN WHITE PINE

Pinus monticola or western white pine was discovered by the explorer, David Douglas, in 1831.

Of a bluish green with a whitish cast, leaves grow in bundles of five and from two to four inches long. The bark of young trees is thin, even and light gray in color. In older trees it is a deeper gray broken into small oblong blocks with curled up edges.

This pine is long-lived, attaining an age of from 200 to 500 years, a height of from about 160 to 170 feet and a diameter of about 18 to 20 inches. Stands are generally quite dense, yielding from 15,000 to 54,000 board feet per acre. The tree grows best in a deep,well-drained, moist soil, does not require much light and ranges in altitude from 1,500 to 6,500 feet. Good seed crops usually occur every three to four years, cone production beginning at between 20 to 40 years of age and the number of seeds per pound varying from 24,000 to 28,000.

The wood is of a light even grain, knots appearing a pinkish red in a cross section. It is quite durable in contact with soil and also when left unpainted and exposed to weather conditions.

The tree has more value commercially than any other specie. Of the total stand in Montana, about 78 per cent is in national forests, 9 per cent is privately owned, 9 per cent is in other federal holdings, and 4 per cent belongs to the state. The total cut for the United States averages 350 million feet annually. The average annual cut for Montana, from 1920 to 1924, was 4,703 M. feet B. M. The weight per cubic foot of green lumber is approximately 39 pounds; for air-dried, 30 pounds, and for kiln-dried, 29 pounds. Of lumber kiln-dried about 35 per cent is select grades, 60 per cent shop and 5 per cent common.

Through rather limited supply and high costs in manufacturing, western or Idaho white pine has become a specialty wood. It is used in cabinet work, in organ pipes, in various parts of machinery, in interior finishing in buildings, where it is of value because it takes paint readily and holds it well, and is used to a large extent for powder and ammunition cases because of its freedom from acids and chemicals.

About 23 gallons of 95 per cent alcohol can be derived from a ton of sawdust and other mill waste and although not at this time produced commercially, experiments in the feeding of hydrolyzed white pine sawdust to cattle have been such as to justify further investigations along this line.

WESTERN YELLOW PINE

In 1826 this tree was brought to the notice of dendrologists by David Douglas, a Scotch explorer, although cones believed to be western yellow pine were found by members of the Lewis and Clark expedition.

Pinus ponderosa is the scientific name of the tree but it is widely known as yellow, bull or western pine.

At the end of bare branches grow heavy brush-like clusters of deep yellow-green with leaves in bundles of three varying in length from about four to 11 inches. Trunks of old trees are marked by broad shield-like plates of russet-red bark, three to four inches—younger trees are brown, black or cinnamon-red.

The tree attains an age of from 350 to 500 years. It ranges in height from six to about 150 or 160 feet, and in diameter, from nine inches to five feet or more. Mature

WESTERN YELLOW PINE

stands are rarely closer than 30 feet. It requires little moisture and the altitudinal range varies from 2,000 to 7,000 feet. Seed years occur at intervals of three to four years. Abundant seed production begins at about 80 years of age, a thrifty tree producing approximately 150,000 germinable seeds at each crop. Experiments show that seeds, in Montana, average from 10,000 to about 18,000 per pound.

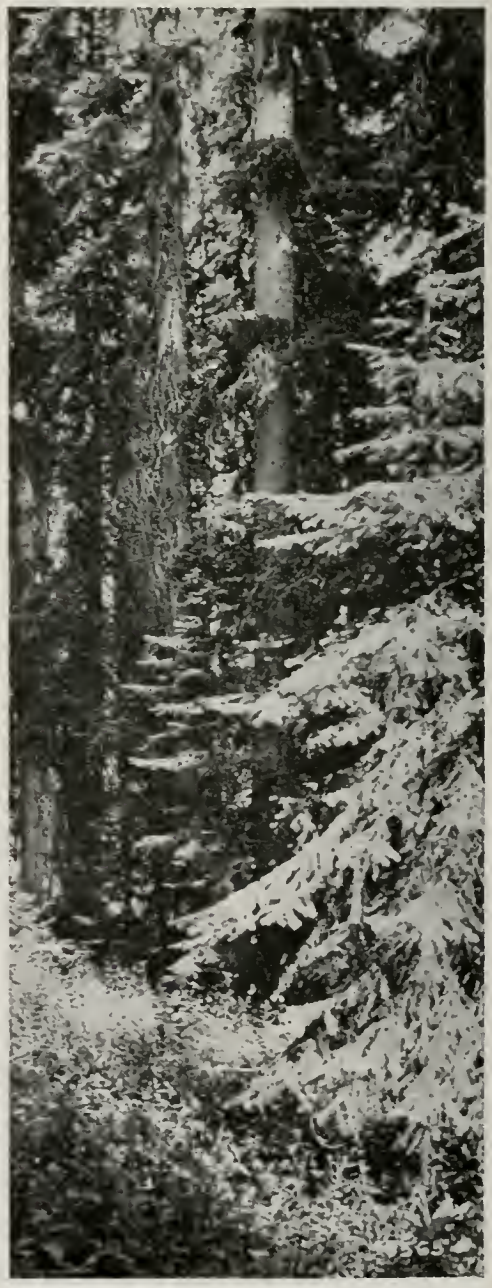
It is the foremost lumber producing tree in Montana. The stand for the United States is estimated to be 250 billion feet, the aggregate annual cut over two billion feet; the stand for Montana, more than 10 billion feet, or four per cent of the total for all states, and the average annual cut, from 1920 to 1924, 143,587 M. feet B. M., or seven per cent of the nation's total. About 44.6 per cent of Montana's total stand is privately owned, 32.8 per cent is in national forests, 17.2 per cent in other federal holdings and 5.3 per cent is owned by the state. The gross weight of yellow pine logs per cubic foot is estimated to be 46 pounds; of air-dried, 29 pounds, and kiln-dried, 28 pounds.

This pine constitutes about 65 per cent of all lumber kiln-dried annually, drying, in Montana, being confined largely to selects, shop, and other such items necessary to fill shortages in air-seasoned stock. Logs average about nine per cent select grades, 17 per cent shop and 74 per cent common. The grain is close, fine and uniform, showing slight waves and twists around knots and presents a smooth, satiny surface when dressed. The wood is used in car construction, furniture, ship building, and is extensively used for mine timber, railroad ties and the like.

It offers possibilities for working in the class of wrapping paper and also along chemical lines, turpentine, light oil, heavy oil, pyroligenous acid, pitch and charcoal being some of the products derived, and turpentine, in particular, may become practicable as the supply of more easily tapped trees is exhausted.

ENGLEMAN SPRUCE

Foliage of the Engleman spruce, or picea engelmanni, is of a blue green with distinct silvery or whitish cast. The bark is thin, of a russet-red and very scaly. Trees attain a maximum age of from 300 to 600 years, height of from 120 to 180 feet and diameter of from two to seven feet. The altitudinal range averages from 4,000 to 11,000 feet. The spruce requires little light and a moderate amount of moisture. Seed production occurs at intervals of from three to four years beginning at approximately 30 years of age and averaging upward of 240,000 seeds per pound.



ENGLEMAN SPRUCE

The wood is soft, of a fine, straight grain, very light brown in color. Green lumber weighs about 38 pounds per cubic foot; air-dried, 24 pounds; kiln-dried, 23 pounds. The annual average cut for the period of 1920 to 1924 amounted to 9,050 M. feet B. M. or 3 per cent of the total cut for all species in Montana. About 13 per cent of all national forest timber in the state is Engleman spruce. Of lumber produced only 3.3 per cent is select grades, a large percentage is of the different grades of common lumber.

A very small quantity of select clear stock has been successfully used in airplane construction. The lumber is used for sash, doors, blinds, general millwork, trunks, valises and so on. It is very suitable for any pulping process and makes a high quality pulp requiring very little bleaching. The annual cut of Engleman spruce pulpwood in Montana is now about 2,000 cords.

LOWLAND WHITE FIR

Deep yellow-green leaves with white under surfaces and blunt points, bark varying from a smooth, ash-gray with many resin blisters to a hard, horny, rather thin, red brown with grayish tinge characterize the lowland white fir (Abies grandis).

The average height, diameter and age of the tree on the general stand is approximately 80 feet, 18 inches, and from 200 to 250 years. Pure stands yield from 20,000 to 25,000 board feet per acre. This species occurs at elevations of from 2,000 to 7,000 feet, attaining the best growth, however, at the lower levels along stream bottoms, as it requires a moist, well-drained soil and considerable light. Seed is produced at intervals of from two to three years and averages about 50,000 per pound.

The wood is soft, of a moderately straight grain, nailing easily, inclined to warping and checking, easily treated with a preservative, pressure treated ties having rendered satisfactory service for over ten years. Green lumber averages 44 pounds per cubic foot; air-dried, 28 pounds; kiln-dried, 27 pounds.

The total stand in Montana is estimated to be about 350 million board feet, the average annual cut, from 1920 to 1924, 5,092 M. feet B. M., or 2 per cent of the total cut for all species. Practically all lumber produced is classed as common grade, but about one per cent as select. It is used for sheathing, sub-flooring, scaffolding, studs, boxes and such, and is generally utilized for pulpwood, producing a good quality of paper used to a large extent by the newspapers.

WESTERN RED CEDAR

Western red cedar is extremely long-lived, the largest trees attaining an age of from 800 to 1,000 years. Leaves are yellow-green, scale-like, flattened on the short side branchlets which, arranged in one plant, form flat sprays that hang like lines of fringe. The bark is less than an inch in thickness, stringy and fibrous, grayish-brown in color.

Trees attain a maximum average height of from 150 to 175 feet, diameter of from five to eight feet and altitudinal range of from 2,000 to 7,000 feet, are tolerant as to light but require an abundance of moisture. Small seed crops occur about every three to four years, abundant crops at longer intervals, and average about 459,000 seeds per pound. Mixed stands of cedar and white pine yield approximately 25,000 to 30,000 board feet per acre. Green lumber averages 27 pounds per cubic foot; air-dried, 23 pounds; kiln-dried, 22 pounds.

The wood is soft, of straight grain, rather coarse, takes paint readily, is durable in contact with soil, poles not treated with a preservative averaging from 10 to 12 years of service, thoroughly treated poles giving easily double that amount. Select grades average about 6 per cent, different grades of common, about 88 per cent. Total stands for the United States are about 53 billion feet, over four billion, or 8 per cent, of which are located in northeastern Washington, northern Idaho and western Montana. The average annual cut, in Montana, is less than one per cent of the total cut for all species.

The lumber is used in professional and scientific instruments, in picture frames and such; as flooring, moulding, shelving and so on, and is extensively used for different kinds of poles and as shingles.

WHITE FIR

WESTERN HEMLOCK

Glossy, yellow-green leaves growing in abundant, pendant sprays of branchlets on wide, sweeping branches; bark of from one to two inches in thickness, hard, furrowed, russet-brown in color, are some of the distinguishing characteristics of western hemlock.

The tree ranges in altitude from sea-level to 7,000 feet, attains an average maximum height of 160 feet, diameter of five feet and age of less than 400 years. Seed production occurs practically every year and averages about 465,000 seeds to the pound. Gross weight of green lumber averages 41 pounds per cubic foot; of air-dried, 29 pounds, and kiln-dried, 28 pounds. The total stand for the nation is about 95 billion feet, that on national forest land in Montana is about 200 million feet. The average annual cut for the United States from 1920 to 1923 was 700 million feet, the average annual cut in Montana amounted to less than one per cent of the state's total cut for all species.

The wood is straight-grained, fairly hard, strong and tough, and is well adapted for use as core stock in veneered products. It is used in machine and car construction, as joists, siding, laths and so on, being suitable for any but the heaviest of construction work.

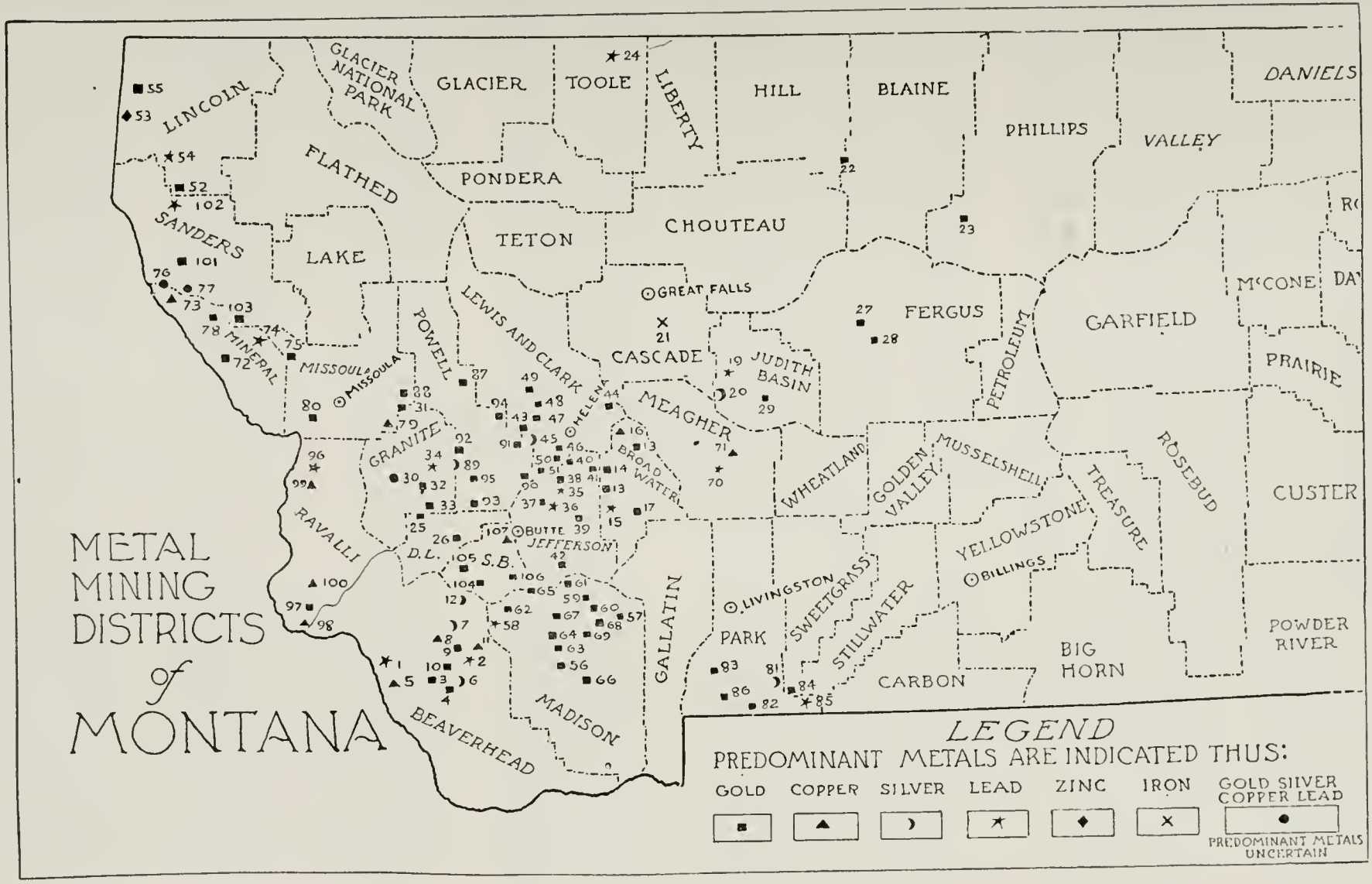
WESTERN HEMLOCK

Western hemlock is still of very little commercial importance in western Montana and Idaho where it is more heavily affected with rot, of smaller size and less abundant than in the Pacific Coast region. The annual production of this wood in the inland Empire region has not shown much change during the past few years, but in Washington and Oregon there has been a rapid increase in the cut.

Western hemlock is manufactured into the common forms of lumber and is well suited for all but the heaviest construction work. It is suitable for scantling, joists, siding, flooring, ceiling and laths. When cut edge-grain western hemlock makes an excellent flooring material. The slash-grain material has a very handsome figure and since it takes a high polish and is easily stained it makes handsome interior trimmings and panels. It is also suitable for sashes and doors, as well as turned stock. It is useful for the manufacture of certain kinds of furniture, such as enameled bedroom furniture, and meets the requirements of the hidden parts of other furniture, such as drawer backs and bottoms, shelves, etc. Considerable quantities are used in the manufacture of boxes, especially for stout packing cases, piano boxes and other containers of heavy construction. The wood when damp resumes a somewhat sour odor and is, therefore, not the most desirable material for the containers of food which might become tainted.

The following list includes other factory uses and wooden products manufactured from the lumber: car construction, trunks and valises, gates and fencing, refrigerators and kitchen cabinets, toys, mine equipment, wooden ware, novelties, machine construction and many others.

WESTERN RED CEDAR


METAL MINING DISTRICTS of MONTANA
LINCOLN
GLACIER NATIONAL PARK
GLACIER
TOOLE
LIBERTY
HILL
BLAINE
PHILLIPS
VALLEY
DANIELS
FLATHED
PONDERA
SANDERS
LAKE
TETON
CHOUTEAU
GREAT FALLS
FERGUS
GARFIELD
McCONE
PRAIRIE
MINERAL
MISSOULA
POWELL
LEWIS AND CLARK
CASCADE
JUDITH BASIN
PETROLEUM
GRANITE
HELENA
MEAGHER
BROADWATER
WHEATLAND
GOLDEN VALLEY
MUSSELSHELL
ROSEBUD
CUSTER
RAVALLI
BUTTE
JEFFERSON
D.L.
S.B.
GALLATIN
YELLOWSTONE
BILLINGS
TREASURE
LIVINGSTON
PARK
SWEETGRASS
STILLWATER
CARBON
BIG HORN
POWDER RIVER
BEAVERHEAD
MADISON
LEGEND
PREDOMINANT METALS ARE INDICATED THUS:
GOLD
COPPER
SILVER
LEAD
ZINC
IRON
GOLD SILVER COPPER LEAD
PREDOMINANT METALS UNCERTAIN

METAL MINING

State Has Yielded About Two and One-Half Billion Dollars—History and Development Is Interesting.

During the successive periods since its first mineral discovery in 1862, Montana has led all the states in gold, silver, copper, or zinc production.

Today she is first in the annual production of manganese, arsenic, and precious stones; is second in the production of silver, third in copper and zinc, seventh in lead, and eighth in gold.

In gross production her record is even better. The mines of Butte alone have given to the world more copper and more silver than any other district on earth; one-third of all the copper mined in the United States and one-sixth of the world's production of copper to date.

In round figures Montana has yielded about $2,500,000,000 in mineral wealth.

This colossal mineral edifice, known as "The Treasure State," reveals a foundation of gold, a ground floor of silver, an upper story of copper and a zinc roof, with composite interior decorations of coal, oil, lead, arsenic, manganese and sapphires.

When in the spring of 1861 James and Granville Stuart found "colors" in the gravelly bed of Gold Creek and started the stampede that resulted in rich strikes at Bannack, Alder and Last Chance Gulches, they builded better than they knew. In three years Montana was a territory and in 28 years a state.

Montana's placers, from 1862 to 1882, yielded approximately $200,000,000. Today only a handful of solitary prospectors in remote mountain fastnesses are panning out their $3 or $4 a day. The $500 nuggets turned up by the sourdoughs of 1870 are now almost as scarce as real elk's teeth on a B. P. O. E. watch charm.

Quartz Mining.

Quartz mining, a contemporary of the placers, began with the discovery of the Decotah Lode near Bannack in November, 1862. Within a few months a mill was set up and put to work, the four stamp stems being made of wood and the shoes and dies of old wagon tires, cut and welded together

Today most of Montana's gold yield is a by-product of copper, zinc and lead recoveries. In 1915 the State produced its greatest yield, 242,078 ounces, valued at $5,003,752. It is now producing about 54,000 ounces annually.

Silver.

The era of silver began in 1865, when a rich vein was discovered in the Travona claim, just west of Butte. Silver development began the following year in the Original mine and a small grinding mill was set up, followed in 1867 by a primitive smelter, which used a blacksmith's bellows for a blast. Really successful silver treatment dates from 1875, when William A. Clark built the Dexter 10-stamp mill in Butte.

Silver smelters were also built and operated at Wickes and Gregory, in Jefferson County. From here silver-lead bullion was hauled in freight wagons to the Union Pacific Railroad at Corinne, Utah. The Wickes plant was succeeded by the present works at East Helena, owned by the American Smelting & Refining Company, which treats the larger part of all silver-lead ores mined in Montana.

Montana has produced more than $350,000,000 worth of silver, the largest output being that of 1918, which amounted to $16,797,479.

Copper.

The third, or copper, period in Montana's mineral history began in 1880, when Marcus Daly, backed by Haggin, Hearst and Tevis, deepened the Anaconda mine at Butte from the 60-foot level to a little more than 100 feet and found, to the consternation of everybody but himself, that instead of silver he had struck copper.

In sharp contrast to the gloom of the old-timers and the pessimism of his partners, Daly was cheerful and optimistic. He contended stubbornly that the

hill was rich in copper and urged the purchase of neighboring properties. He insisted that he was going to mine and ship enough high-grade ore to Swansea, Wales, to secure the money necessary to build a huge smelter, capable of treating the enormous deposit of copper ore which he claimed was hidden beneath the rugged contour of Butte Hill.

Every mining engineer west of the Mississippi was skeptical. Half the people of Butte called him a visionary. Some thought he was crazy. Daly persisted. He bought up or leased many other properties, started operations on a big scale, and made Butte the greatest mining camp on earth.

Today three monuments vindicate Daly's vision and faith. One stands opposite the Federal building in Butte. It is a bronze replica of his face and figure, and one of the last masterpieces of August St. Gaudens. Another is the huge Anaconda Reduction Works, the largest non-ferrous smelter in the world, which, incidentally, boasts the world's largest smoke stack, nearly 600 feet high. The third is the Anaconda Copper Mining Company, the largest copper mining, smelting, refining and fabricating organization in the world, with 40,000 stockholders and properties in a dozen states and several foreign countries.

Discovery of Gold.

The real development of Montana began with the discovery of gold in commercial quantities. In 1852 a half-breed named Benetsee, who had lived in California, discovered gold on Gold Creek in what is now Powell County. Six years later the Stuart brothers verified the discovery, and in 1861 began mining there. About this time gold in paying quantities was found on the Salmon River and its tributaries in Idaho and an immigration from Colorado to the Salmon set in, many of the seekers passing through Montana and prospecting en route.

August 16, 1862, John White and others discovered gold on Grasshopper Creek near the old town of Bannack, now in Beaverhead County. Other rich bars were found in the district and mining began in earnest and by January of the following year the town had a population of 500 souls. The fame of the diggings spread throughout the West and gold hunters poured in.

Alder Gulch, Madison County, where Virginia City was built, was discovered in the summer of 1863 by William Fairweather's party while returning to Bannack from the Big Horn Mountains in eastern Montana, having been driven out of the region by the Crows. The next important discovery was Last Chance Gulch, where Helena now stands, in the fall of 1864, by John Cowan.

During the next decade in Montana about 500 gold-bearing gulches, varying from half a mile to 20 miles in length, were discovered. The gold production of the territory from 1862 to 1876, inclusive, is estimated at $144,400,000. The first quartz lode in Montana was the Decotah lode, located near Bannack, November 2, 1862.

Although at the present time Arizona and Utah, with their low cost porphyries, are outstripping Butte in annual copper production, she still retains first place as the nation's largest producer to date. In the 40 years since operations were started, Butte has produced 8,900,000,000 pounds of blister copper, or 27 per cent of the nation's total output. Her present annual production is about 270,000,000 pounds, or approximately 14 per cent of the copper production of the United States.

Zinc.

Within the last 12 years Montana initiated and brought to rapid development the fourth state in her mineral history—that of zinc. Butte Hill was long known to contain important deposits of zinc ores. But they were so refractory as to be considered more of a liability than an asset. For years the metallurgists of Anaconda Company wrestled with the problems of reduction until finally, in 1916, an electrolytic process was devised whereby the ores were not only reduced on a satisfactory commercial basis but the resultant grade zinc became the purest known to commerce—99.9 per cent pure.

It is significant that before this process was evolved, thereby saving to Butte an imperiled industry, years of ceaseless effort and $7,000,000 in cash were expended before the company realized a penny of profit. Courage and enterprise are today being rewarded. Montana's present production of electrolytic zinc is 360,000,000 pounds a year, of which about one-half is from Montana ores.

MINERAL PRODUCTION IN MONTANA FROM 1900 TO 1927 INCLUSIVE*

(U. S. Geological Survey Figures)

Year	Gold	Silver	Copper	Lead	Coal	Zinc	Value of Precious Stones	Manganese	Petroleum	Gas	Rank of State in Val. of Mineral Production	Total** Value
	Fine ozs.	Fine ozs.	Pounds	Short Tons	Tons	Short Tons		Long tons Contains 35% or more	Barrels	Cu. Ft.		
1900	227,266	14,195,400	270,738,489	8,022	1,661,775	.....	.....	.....	.....	.....	..	.....
1901	229,495	13,131,700	229,870,415	5,791	1,396,081	.....	.....	.....	.....	.....	..	.....
1902	211,571	13,243,800	288,903,820	4,438	1,560,823	.....	.....	.....	.....	.....	..	.....
1903	213,425	12,642,300	272,555,854	3,303	1,488,810	.....	.....	.....	.....	.....	..	.....
1904	206,419	12,817,285	298,314,804	3,635	1,358,919	.....	.....	.....	.....	.....	..	.....
1905	231,913	13,231,300	314,750,582	2,207	1,643,832	.....	.....	.....	.....	.....	..	$65,501,049
1906	216,168	11,980,705	294,701,262	2,485	1,829,921	1,415	.....	.....	.....	.....	..	74,126,567
1907	167,987	11,129,600	224,263,789	2,145	2,016,857	122	$229,800	.....	.....	.....	..	60,663,511
1908	152,865	10,356,200	252,503,651	2,320	1,920,190	820	58,397	.....	.....	.....	..	46,803,841
1909	181,411	12,034,500	314,900,279	1,451	3,756,530	4,680	44,998	.....	.....	.....	..	57,492,806
1910	179,975	12,282,900	283,078,516	1,943	2,920,970	15,819	57,923	.....	.....	.....	9	54,388,119
1911	179,499	11,985,196	271,816,098	2,484	2,976,358	21,905	221,613	.....	.....	.....	7	53,498,194
1912	175,371	12,731,638	308,794,483	2,517	3,048,495	13,459	200,585	.....	.....	.....	7	71,620,873
1913	168,994	13,819,201	285,724,467	3,256	3,240,973	44,337	244,935	.....	.....	.....	10	69,307,056
1914	199,203	12,536,700	236,805,845	4,386	2,805,173	55,790	67,452	.....	.....	.....	9	54,244,889
1915	242,077	14,423,173	268,263,040	4,853	2,789,755	93,573	105,355	.....	.....	.....	8	89,147,138
1916	220,130	16,494,366	352,139,768	4,961	3,632,527	114,630	108,263	6,418	44,917	.....	7	142,650,179
1917	170,147	13,128,142	276,225,977	5,933	4,226,689	93,130	59,130	61,109	99,399	334,421	10	123,733,415
1918	158,704	16,378,263	326,426,761	18,568	4,532,505	104,624	47,753	199,932	69,323	177,039	11	139,331,507
1919	119,085	12,541,181	169,981,288	17,219	3,236,000	84,382	48,391	24,993	89,000	858,000,000	..	73,630,824
1920	91,862	12,579,178	177,059,260	15,627	4,413,866	92,169	223,196	76,441	336,000	817,733,000	..	85,885,503
1921	71,632	6,558,713	48,098,730	10,183	2,733,968	11,638	489,621	11,129	1,509,000	336,000	..	30,161,734
1922	80,145	12,468,151	165,754,442	14,883		59,534		9,751	2,369,000		..	‡59,871,000
1923	85,079	13,380,862	224,125,264	17,973	.....	70,730	.....	21,916	58,487,479	Value is for		
1924	97,854	13,289,303	249,152,062	19,738	.....	64,238	.....	35,445	56,014,467	metals as listed		63,000,000
‡1925	87,407	13,507,900	269,520,400	20,996	.....	51,250	.....	.....	60,802.100	by U. S. G. S.		
1926	60,500	12,769,092	255,372,862	21,153	2,831,849	73,702	.....	.....	7,534,561	.....	..	61,500,000
1927	53,750	11,097,100	224,600,000	18,250	3,027,746	71,700	.....	.....	5,028,643	.....	..	50,000,000

* See table on page 186 for Mineral Production of Montana from 1862 to 1899, inclusive.

** The total production from metal mines in 1925 is estimated at $66,000,000.

‡ Preliminary estimate by U. S. G. S.

Manganese.

According to the United States Geological Survey, Montana contains the nation's "greatest, best developed and most available domestic reserves of high grade manganese ore," whose importance came to light during the World War. Requirements of eastern steel-makers for ferro-manganese created the demand. The Butte and Philipsburg districts of Montana afford the supply.

Estimates made in 1918 showed that Philipsburg contained about 500,000 tons of manganese ore reserves, with nearly as much in sight at Butte. During the four years, 1916-1919, these districts produced close to 300,000 gross tons of manganese ore, thus contributing heavily to the successful manufacture of manganese steel, a prime war necessity. At the present time, chiefly due to available low-priced ore from foreign lands, less domestic manganese is being mined than during the war. However, Montana leads the nation with annual shipments, exceeding 50,000 tons.

Arsenic.

The need of white arsenic in large quantities with which to fight the boll weevil blight on southern cotton plantations has stimulated Montana's present day output. About 220 carloads, constituting practically one-half of the national output, are shipped from this State each year.

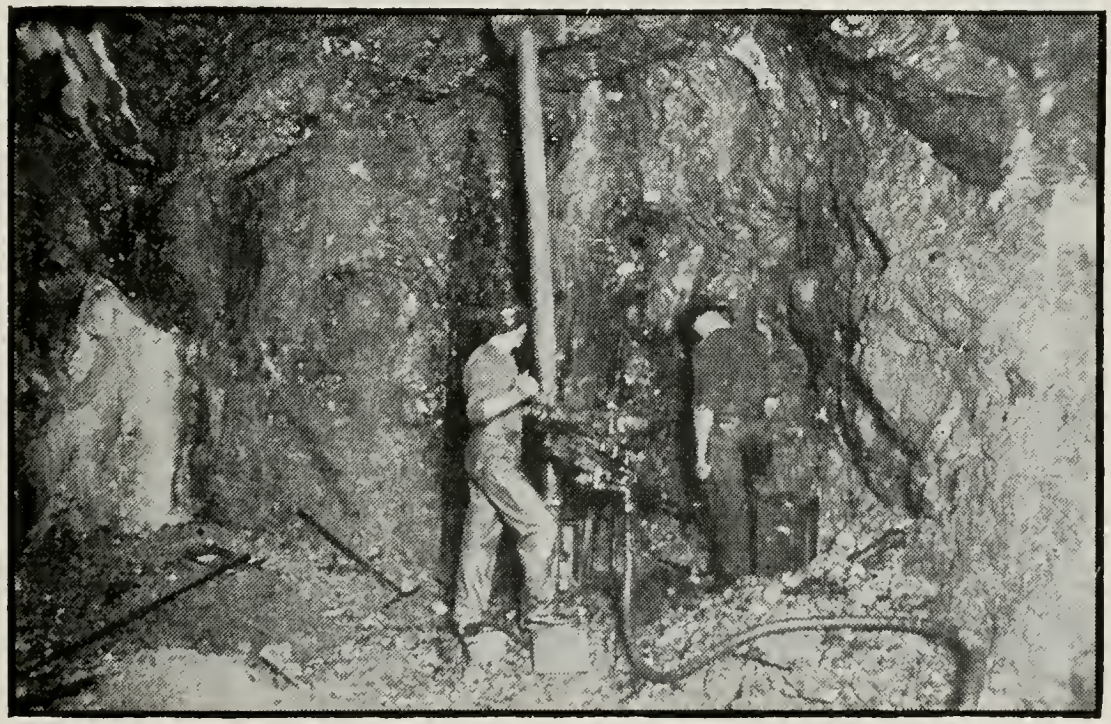
Lead.

Unlike the other metals, Montana's production of lead is not confined chiefly to Butte. The State's 1927 output of some 36,500,000 pounds was gathered from widely scattered areas whose combined yield places Montana in sixth place among the states producing this metal.

Precious Stones.

It is reliably stated that America's chief yield of precious stones comes from the sapphire mine of Yogo Gulch, Judith Basin County, Montana; and that their value represents fully one-half of the national output in precious stones.

Yogo gem stones are acknowledged to be among the finest in the world, excelling the oriental sapphire in evenness of color, radiance under artificial light, and perfection in matching. The Yogo mine has been operating since 1898 and has produced about $12,000,000 worth of sapphires. Its present annual production is about 500,000 carats of gem stones and 5,000 ounces of stones for mechanical use.



FACE OF DRIFT UNDERGROUND, IN A MONTANA MINE

Moss agates are also found in many sections of the State and are produced commercially in a small way.

Shale.

Montana's practically inexhaustible supply of limey shale has been exploited by one manufacturer, who quarries and makes into cement some 300,000 tons each year. Two concerns quarry some 50,000 tons of gypsum, which is made into plaster and marketed in Montana and nearby states.

Phosphate.

Phosphate rock, which is plentiful in this region, can be easily combined with sulphuric acid, an important by-product in treating the local sulphide copper ores, in the manufacture of a treble super-phosphate fertilizer. Such a product (made, however, from Idaho rock), running into fairly large tonnages, has been put on the market by the Anaconda Company.

Coal.

Fifty out of Montana's fifty-six counties yield coal in commercial quantities. The varieties include semi-anthracite, bituminous, semi-bituminous, and lignite. Of all the lignite coal in the country, the United States Geological Survey reports that Montana contains 381,000,000,000 tons, or more than one-third of the nation's total. Annual normal production of all varieties is about 3,000,000 tons, the output in 1917 being raised to 4,226,000 tons. About 95 per cent of the output is used within the State, chiefly by the railroad, mining and manufacturing interests.

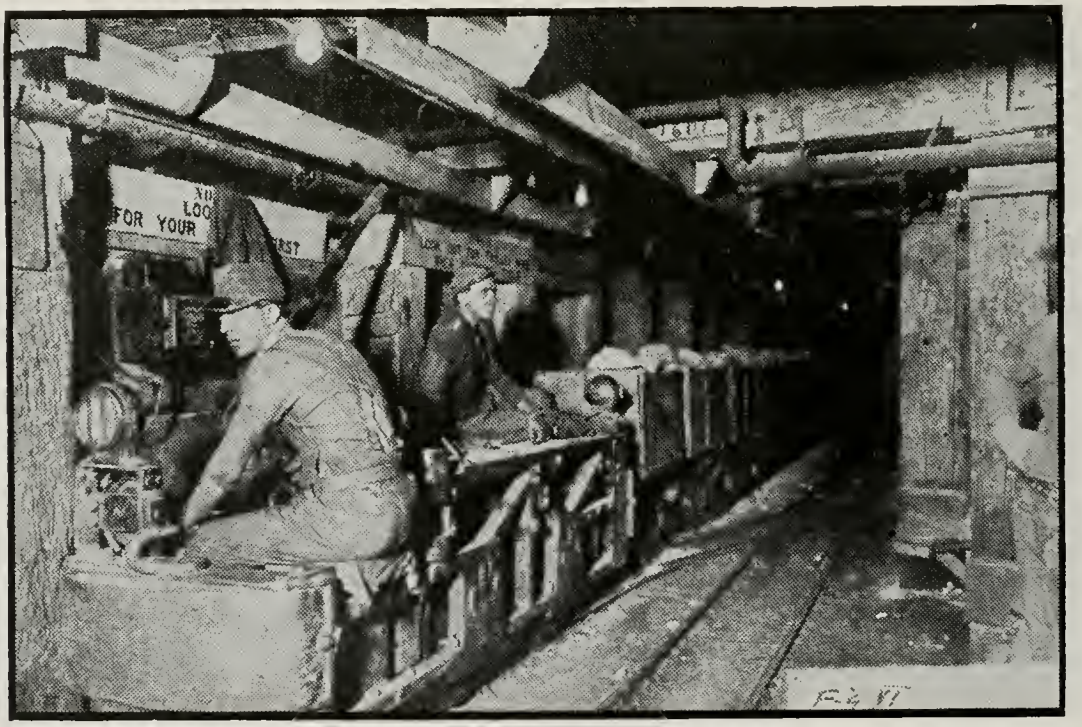
(See chapter on Coal Resources.)

MINERALS.

Montana's mineral contribution to the world includes gold, produced in 21 of her counties; coal, possessing three varieties, besides lignite; platinum, antimony, arsenic, silver, bismuth, cadmium, chrome, copper, iron, lead, manganese, molybdenum, tungsten, uranium, and zinc. Selenium, tellurium, and palladium are also recovered from electrolytic slimes.

Montana is also a large producer of non-metallic minerals, among which are alabaster, asbestos, barite, bentonite.

In addition to the above she possesses deposits of pottery clays, corundum, crystalline limestones and marbles, fluorite, Fuller's earth, graphite, gypsum,



ELECTRIC TRAMMING UNDERGROUND

kaolin, and mica. Her oil shales are rich and carry immense potential values. (See chapter on Fuel and Energy Resources.)

Practically the entire world's supply of sapphires is derived from Siam, from Australia, and from the State of Montana. The greatest regular sapphire production in the world comes from the mines of the New Mines Sapphire Syndicate, located on Yogo Creek, 25 miles southwest of Hobson, in Judith Basin County.

The syndicate owns approximately 1,550 acres and the sapphire lode extends 5½ miles. The property includes a continuous series of 18 lode claims, two of which have been worked to a certain extent for the last 25 or 30 years.

The quality of the Yogo blue sapphires is unexcelled by those of any other district in the world. The finest stones are cut partly in London and partly in Paris. Quite a number of fine stones and all of the inferior are cut in the French Jura. Inferior specimens are sold in parcels. Many caliber stones and the very thin and poorer stones are cut principally in Switzerland and from there distributed, most of the output going into watch jeweling.

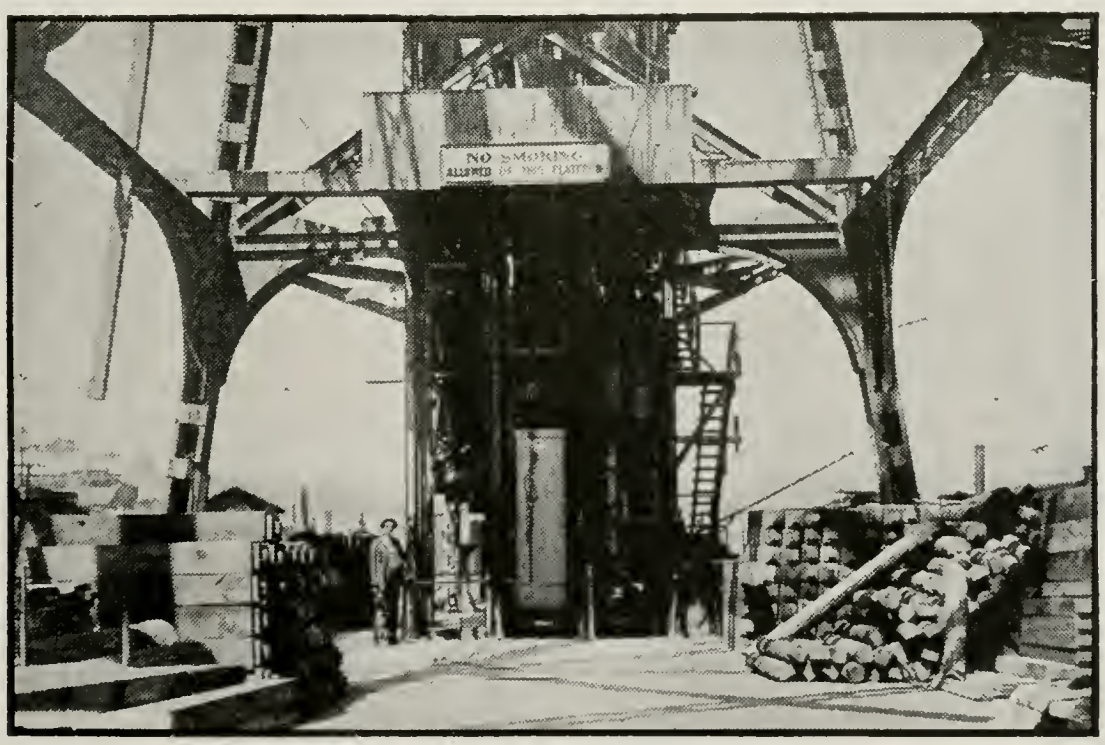
Yogo Sapphires.

When Jim Ettien, a roving sheepherder, on a bleak February day in 1896 picked a handful of blue pebbles from a gopher hole, 10 miles east of Yogo Creek in what is now Judith Basin County, he made the first gesture in the development of what is really the unique industry of Montana.

Ever since 1879 prospectors had been scouring the lower water courses of the Little Belt Mountains in search of gold. In 1894 S. S. Hobson and Dr. J. A. Bovette thought they were warranted in building a flume and ditch from Yogo Creek to a point 10 miles distant. The gold netted the ditch builders less than $1,000, and their project was a failure. But the blue pebbles, after examination by a New York gem expert, proved to be sapphires of high quality whose discovery marked the beginning of an industry which has continued without interruption for 30 years and made Montana famous in the gem markets of the world.

The ore deposit fills a vertical fissure forming a dyke similar to the diamond bearing clay of South Africa, about eight feet wide, 3½ miles long and of unknown depth.

The pay dirt was originally hoisted in buckets through surface cuts by hand windlass. No timbering being done, these cuts could never exceed 30 feet in depth. Tunnels were therefore dug and in 1903 a shaft was sunk, since when operations have been conducted in the orthodox manner. The principal workings are now at the 250-foot level, from which two drifts have been driven east and west.



A THREE-WAY MINE HOIST

Cadmium.

There are several cadmium minerals, but none of them occurs in quantities large enough to be called ores. Commercial cadmium is derived from zinc minerals and ores, in which it nearly always occurs in minute quantities, the ratio in Butte ores being about one of cadmium to 500 of zinc.

Of the six or eight concerns in the United States making cadmium, the Anaconda Copper Mining Company, at its Great Falls plant, is the only Montana concern producing this metal. This company began making metallic cadmium early in 1923 and its production in 1927 amounts to 377,000 pounds. The recovery of cadmium is incidental to purifying the zinc solution at the electrolytic zinc plant.

Metallic cadmium is used as an alloy in materials requiring a low melting point, such as sprinkler system heads, releases on fire doors, in stereotype plates, silver plating and dental amalgam. Cadmium is reported to be a better rust resister than nickel.

Mineral Production in Montana.*

YEAR	Gold	Silver	Copper	Lead	Totals
1862 to 1881.....	$200,000,000	$11,000,000	$	$	$211,000,000
1882	2,550,000	4,370,000	1,539,860	$	8,459,860
1883	1,800,000	6,000,000	3,452,960	226,424	11,479,384
1884	2,170,000	7,000,000	5,386,500	246,326	14,802,826
1885	3,400,000	11,500,000	6,779,800	274,350	21,954,150
1886	4,402,000	13,849,000	5,761,200	491,132	24,526,332
1887	5,978,536	17,817,548	8,853,750	607,662	33,257,496
1888	4,200,253	15,790,736	15,103,946	569,160	35,664,095
1889	3,500,000	19,393,939	13,334,970	456,975	36,685,884
1890	3,300,000	20,363,636	16,630,958	964,089	43,029,827
1891	2,890,000	20,139,394	14,377,336	1,229,027	38,635,757
1892	2,891,386	22,432,323	19,105,464	990,035	45,419,208
1893	3,576,000	21,858,780	16,630,958	946,089	43,029,827
1894	3,651,410	16,575,458	17,233,718	730,551	38,191,137
1895	4,327,040	22,886,992	21,114,869	754,360	49,083,261
1896	4,380,671	20,324,877	25,356,541	670,010	50,732,099
1897	4,496,431	21,730,710	26,798,915	928,619	53,954,675
1898	5,247,913	19,159,482	26,102,616	809,056	51,319,067
1899	4,819,157	21,786,835	40,941,906	909,410	68,457,308

* For table showing Mineral Production in Montana from 1900 to 1925, inclusive, table at beginning this chapter.

Summary of 1927 Output.

The output from mines in Montana in 1927 carried total values of about $50,000,000 with the value of the five principal metals, gold, silver, copper, lead and zinc, placed at $48,078,000, a decrease from $59,410,000 in 1926. Manganese, precious stones, and minor minerals, as well as the value of output of gypsum and lime rock are included in the total.

The value of gold decreased from $1,250,000 in 1926 to $1,111,000 in 1927; silver production from 12,679,000 ounces in 1926 to 11,097,000 ounces in 1927; copper from 255,372,000 pounds to 224,600,000 pounds in 1927; lead from 42,306,000 pounds in 1926 to 36,500,000 pounds in 1927, and zinc from 147,401,500 pounds in 1926 to 143,400,000 pounds in 1927.

In addition to the slight curtailment in operations, there was a decline in metal prices during the year. Silver produced was valued at $7,968,000 in 1926 compared with $6,292,000 in 1927, copper at $35,752,000 in 1926 and $29,198,000 in 1927; lead at $3,384,000 in 1926 and $2,471,000 in 1927, and zinc at $11,055,000 in 1926 compared with $9,000,000 in 1927, by the bureau of mines.

Mining by Counties.

A little more than ninety per cent of Montana's 1927 mine output, valued at about $50,000,000, was produced in Silver Bow County, but sixteen additional counties participated in the industry. Gross proceeds of the industry in Silver Bow County are placed at $45,790,000. Cascade County is second with production valued at $650,000. Other counties in order are Granite, $500,000; Jefferson, $400,000; Fergus, $400,000; Gallatin, $300,000; Lewis and Clark, $279,000; Judith Basin, $250,000; Beaverhead, $150,000; Madison, $125,000; Lincoln,

$80,000; Deer Lodge, $50,000; Park, $35,000; Powell, $25,000; Mineral, $20,000; Broadwater, $17,000 and Sanders, $10,000.

Silver Bow County also has the widest range in metal output, producing gold, silver, copper, lead, zinc, cadmium, sulphur, arsenic, manganese, tellurium and silenium in commercial quantities.

Cascade produces silver, copper and lead, mostly from the Silver Dyke property at Neihart.

Granite County is an important source for manganese and sapphires. The sapphires are obtained from placer operations and are used mostly for industrial purposes. Considerable silver was obtained last year from the Granite Bimetallic tailings.

Gypsum and lime rock make up the principal output in Fergus and Gallatin Counties.

Judith Basin produces the famous Yogo sapphires.

Jefferson, Lewis and Clark, and Madison are gold producers. The old Drum Lummon mine at Marysville, operated by the St. Louis Mining and Milling company of Montana was the only large gold producer that increased its output in 1927. The Angelica mine in Jefferson and the East Pacific in Lewis and Clark are also mentioned as heavy producers of silver and lead during the year in the bureau of mines' report. The Liberty Montana in Jefferson was operated but seven months during the year, while the Jib at Basin was idle.

Production in Park County of gold and arsenic was much smaller than usual as the mine at Jardine, the second largest producer of gold in Montana in 1925 and 1926, was practically idle.

Mineral Reservations and Patented Mining Claims.

The foregoing brief analysis by counties of mineral production in the state does not tell of the immense districts, at present, unexploited.

Mineral reservations totaling more than two million acres are found in forty of the fifty-six counties. There are approximately 250,000 acres of patented mining claims located in thirty counties. The subjoined tables give this data in detail:

Patented Mining Claims.

County	No. of Acres	County	No. of Acres
Beaverhead	9,049	Madison	18,490
Blaine	200	Meagher	2,979
Broadwater	7,382	Mineral	4,549
Carbon	14,976	Missoula	1,462
Cascade	5,740	Musselshell	11,796
Dawson	877	Park	6,202
Deer Lodge	9,238	Phillips	676
Fergus	4,561	Pondera	65
Golden Valley	640	Powell	15,485
Granite	16,013	Rosebud	6,802
Jefferson	37,801	Sanders	1,298
Judith Basin	4,266	Sheridan	747
Lewis and Clark	21,046	Silver Bow	39,769
Liberty	268	Stillwater	708
Lincoln	4,796	Petroleum	....

Mineral Reservations.

County	No. of Acres	County	No. of Acres
Beaverhead	....	Meagher	61,030
Big Horn	16,964	Mineral	1,261
Broadwater	3,671	Missoula	28,250
Cascade	71,231	Musselshell	175,587
Custer	....	Park	37,931
Dawson	100,948	Petroleum	20,836
Deer Lodge	2,846	Powder River	88,581
Fallon	107,876	Powell	4,290
Fergus	6,034	Prairie	141,864
Gallatin	46,834	Ravalli	4,323
Garfield	50,302	Richland	40,847
Golden Valley	138,350	Rosebud	515,895
Granite	3,244	Sanders	3,371
Jefferson	9,060	Silver Bow	....
Judith Basin	28,612	Stillwater	27,046
Lake	635	Sweet Grass	45,073
Lewis and Clark	16,740	Treasure	18,360
Lincoln	2,402	Wheatland	33,487
Madison	66,685	Wibaux	39,948
McCone	12,463	Yellowstone	107,307

FUEL AND ENERGY RESOURCES*

Raw, Process, Energy and Fuel Materials Found in Montana—Use, Location of Deposits, Etc.

COAL

See chapter on coal and coal mining in Montana.

ELECTRICITY

See chapter on hydro-electric water power developments in Montana.

NATURAL GAS

Uses—An ideal domestic fuel and used especially as an industrial fuel in glass works, cement plants, brickyards, factories and metallurgic plants. Also used in making carbon black, a constituent of rubber tires, paints and inks. From some natural gas the gas helium, used as a non-inflammable substitute for hydrogen in balloons, is extracted.

Occurrence—See chapter on Natural Gas.

PETROLEUM—See Chapter on Petroleum in Montana.

MINERALS—METALLIC

ALUMINUM

Uses—In household utensils, instruments, parts of internal combustion engines and many other articles in which lightness or resistance to oxidation, or both, are essential. Bauxite, the most important ore of aluminum also used for making artificial abrasives by fusing it in the electric furnace, for producing aluminum salts, and for making refractory brick for furnace lining.

Occurrence—Reported on Sweeney Creek, west of Florence, Ravalli county.

ANTIMONY

Uses—Principally for making alloys with other metals, oxides in enamels and pigments, sulphides in pigments, vulcanizing rubber and safety matches. In war used for hardening bullets, in shell primers and in powder designed to produce dense smoke or explosion.

Occurrence—Reported in Sanders county, on Prospect Creek, in blanket beds, some of which are three feet thick. Also contained in the grey copper ores of the Butte district which run about 25 per cent antimony. This is not being recovered as a by-product. U. S. G. S. says antimony deposits in this state have been worked only during high prices. Also found in Missoula county.

BISMUTH

Uses—In metallic form for making low-fusing alloys or cliche metals which are used in automatic fire sprinklers, fuses for electric wiring, and solders. Some of the salts have a smooth unctuous feel, and are used in face and toilet powders and in medicinal preparations. Also employed to a small extent in making optical glasses.

Occurrence—With the copper ores of the Butte district which tests made in 1911 showed carried 20 pounds bismuth to the ton. Investigator reported not worth saving at $35 a ton, but U. S. G. S. confident process will be evolved for isolating bismuth from flue dust as rich as that derived from Butte ores.

CADMIUM—See chapter on Mining in Montana.

CHROMITE

Uses—It is the chief ore of the metal chromium which is smelted in the electric furnace to produce the alloy of iron and chromium called ferrochrome, used in making chrome steel, another alloy, remarkable for its hardness. Fuses or melts only at a very high temperature and used as refractory material for lining furnaces. Chemical compounds of chromium are used in making pigments, dyes and mordants in oxidizing, bleaching and tanning.

Occurrence—Two deposits of chromite are reported in Montana by the U. S. G. S., one, ten miles southwest of Red Lodge, between Rock Creek and West Fork of Rock Creek (Carbon county), and the other in Stillwater and Sweet Grass counties. This latter deposit starts on Boulder River in Sweet Grass county, 10 miles south of McLeod, and extends in a general direction south of east for 27 miles, to Fishtail Creek, in Stillwater county. It is not only one of the largest deposits in the United States, but the U. S. G. S. says, "the form of occurrence of the chromite in this belt is radically different from that of deposits farther west in California and Oregon, and there is much stronger reason for counting on continuity in depth here than there."

Estimates of the available tonnage have been made for only 19,000 feet in a total length of 27 miles. This estimate is 350,000 tons to a depth of 100 feet, but the U. S. G. S. says without doubt the ore goes beyond that depth to a considerable distance, possibly 1,000 feet. Seven samples returned assays averaging 36.5 per cent of chromic oxide with an iron content of 16 to 19 per cent. The assays were taken in the main, or high grade ore body which averages 12 inches to two feet thick. The mixed ore, which averages four feet in width, assays 5 to 25 per cent chromic oxide. Concentrating tests, it is reported, show the mixed ore will concentrate to a 39.8 per cent chromic oxide ore with a 53 per cent saving of the chromite. The assays made of this chromite ore indicate it will suit the requirements of steel manufacturers. In making a ferrochrome containing six per cent of carbon it is necessary to use a chrome ore containing at least twice as much chromium as iron in order to produce a ferrochrome containing 60 per cent of chromium.

* Revised June 1, 1928.

Robert M. Keeney of the Bureau of Mines is quoted to the effect that "ferrochrome can be easily manufactured directly from chromite in the electric furnace." The U. S. G. S. says: "The metallurgy of chromite has apparently been so developed in the hydro-electric process as to utilize to advantage relatively low grade ores such as are most abundant in the United States, and the further development of that process on the Pacific coast, where water power abounds, would greatly diminish the handicap of long transportation."

In 1919, 61,404 long tons of chromite were imported into the United States.

COPPER—See Chapter on Mining in Montana.

GEMS AND PRECIOUS STONES—See Chapter on Mining in Montana.

GOLD—See Chapter on Mining in Montana.

IRON

Uses—Modern civilization is based upon the fabrication of this metal. This is the age of the machine, mostly made from steel, a product of iron.

Occurrence—Three deposits of iron ore in Montana have been reported by the U. S. G. S., but there are reports of many other deposits, upon one of which—in Meagher county—considerable exploration work has been done. This deposit and the one in Cascade and Judith Basin counties which has been examined by the U. S. G. S. are the only ores in the state at present of known commercial importance.

In central Montana, on Running Wolf and Dry Wolf Creeks, 12 miles southwest of Stanford, on the Great Northern Railway, and about 54 miles southeast of Great Falls (Cascade and Judith Basin counties), is found iron ore known as the Running Wolf hematite deposits. The ore bodies range in width from five to 60 feet and average about 20 feet. On two claims at the east end of the property, the U. S. G. S. estimates there are one million gross tons of ore. The U. S. G. S. says: "The ore in places contains enought magnetite to make it react to the magnet. It is not to any large degree limonitic at the surface. At one point where a considerable depth has been reached, the ore contains a little pyrite and chalcopyrite. Mineralogically, the ores are entirely satisfactory for steel manufacture. Ore is exposed at points along the middle of the belt, but no estimate of tonnage can be attempted here. At the west end showings are better. Ore appears at intervals through a distance of nearly a mile, and the average of the thickness of the ore body in the different openings is 20 feet. The present availability of this ore depends on several factors which cannot be considered in this paper, such as the cost of transportation to central and eastern manufacturing points and the possibility of economic production of iron in the nearby Rocky Mountain region."

Extensive deposits of high grade iron are reported on Sheep Creek in the northern part of Meagher county. It is said the mineralized area extends through the Belt Mountains 50 miles, but the workable deposits are found in a circular area of 2,500 acres. The iron content is said to range from 35 per cent in soft earth to 65 per cent in two main outcroppings of iron cliffs. Private geologists have reported from 80,000,000 to 140,000,000 tons of workable ore in sight, of which 100,000,000 tons could be recovered by means of the steam shovel. The ore body has been prospected to a depth of 40 feet without going out of ore, and geologists report the contour is such as to indicate the ore goes to a depth of 200 feet.

The U. S. G. S. reports the existence of magnetite beds over the west half of the Blackfeet Indian reservation, Glacier county, which can be traced for many miles entirely across the reservation. The principal beds are found on the South Fork of the Milk River. The beds are a number of small, widely scattered areas which contain rich magnetite sandstones reaching a thickness of nine feet, with an average thickness of four to five feet. The U. S. G. S. says a considerable tonnage of ore which would average about 50 per cent of iron could be hand sorted from the deposits. It concludes: "The proportion of titanium oxide in the ores is considerable, averaging over 12 per cent in one sample. This high titanium content renders these ores unfit for use, according to present metallurgical practice, although it must be recognized that ores of this type may eventually be successfully smelted."

On the south side of Birch Creek, about half a mile south of the Indian Queen mine, six miles west of Apex station, Beaverhead county, the U. S. G. S. reports deposits of magnetite iron ore. They occur as irregular pockets and have been opened by shallow pits and shafts to obtain fluxing material for copper or lead smelters.

Reported that Smoky Butte, 10 miles west of Jordan, Garfield county, is a mountain of high grade iron ore. Much meteoric iron found in that region and particularly near Smoky Butte. So far as known, no examination by geologists has ever been made.

In 1919, 476,461 long tons of iron ore were imported into the United States.

LEAD—See Chapter on Mining in Montana

MANGANESE—See Chapter on Mining in Montana.

NICKEL

The mineral pyrrhotite, which is frequently nickeliferrous, is found in Montana in only one locality, near the chromite deposit on the Boulder River in Sweet Grass county. Nothing much is known concerning the deposit, except that it contains nickel. Reported in Mineral county.

MOLYBDENUM

Uses—A metal of potential rather than actual use. Encouraging results reported from experiments made with a view of using small quantities molybdenum to make steels of high tensile and torsional strength and great elasticity. Also used in incandescent lamps and in X-ray tubes.

Occurrence—The U. S. G. S. says, "among the principal deposits of molybdenum ores known are . . . . . near Emigrant (Park county), and at other places in Montana." Also reported by U. S. G. S. in Potosi mining district, 14 miles southwest of Pony, Madison county. Reported two miles east of Ophir, Powell county, and also 30 miles northwest of Dillon, Beaverhead county, 10 miles west of Oregon Short Line. Wulfenite, a lead malybdenate, is found near Radersburg, Broadwater county.

In 1919, 106,743 pounds of molybdenum ore were imported.

PLATINUM—See Chapter on Mining in Montana.

SILVER—See Chapter on Mining in Montana.

TIN—Stream tin is found in the sands and gravels of the upper Bitter Root River.

MONAZITE

Used in the manufacture of manties for incandescent lights. Found in the sands of most streams of western Montana. This mineral is a phosphate of cerium, lanthanum and didymium, usually with thorium oxide, and the commercial deposits are always placer. It is heavier than ordinary minerals and "hangs back" in a placer pan. Deposits occur in the black sand at Princeton, Granite county; near Norris, Madison county; and in most of the placer deposits of the extreme western part of the state. As yet no deposits have been worked commercially and, therefore, the extent of monazite in Western Montana is not known.

TUNGSTEN—See Chapter on Mining in Montana.

URANIUM

Uses—As an alloy for making high speed tools, in gas mantles and electric lamp filaments; in salts and other forms used for iridescent glass and pottery glazes, in porcelain-painting and calico-printing, in medicine and in chemical determinations. Most widely known as the chief source of radium which is extracted chiefly from the carnotic and pitchblende ores of the uranium group.

Occurrence—State School of Mines tested sample of uranium ore from Carbon county that ran about 25 per cent in radioactivity.

In 1919, 6,026,005 pounds of steel hardening ore were imported.

ZINC—See Chapter on Mining in Montana.

MINERALS—NON-METALLIC

ALABASTER

Uses—A fine-grained variety of gypsum occurring in the massive form. For small statues and other ornamental designs.

Occurrence—Large deposits reported by Rowe in the Little Snowy Mountains in Fergus and Golden Valley counties.

ARSENIC—See Chapter on Mining in Montana.

ASBESTOS

Uses—Fireproof cloth for firemen's suits, theater curtains, steam packing and other forms of heat insulation and non-conducting coverings; low-grade material constituent of various building products; in electrical industry where both insulation and resistance to high temperatures are required.

Occurrence—Reported in Gallatin county, 16 miles northwest of West Yellowstone and also in Madison county, in Madison range east of Ennis. Also in Bear Tooth Mountains, south of Red Lodge, Carbon county.

Asbestos embraces two different mineral species. There is a hornblende asbestos, sometimes called the long fibre, and a serpentine asbestos, sometimes called chrysotile, or the short-fibred asbestos. The latter kind is more common in Montana. The Montana-Idaho Asbestos Company, operating in Madison county near the Idaho boundary, reported having reached the production stage during the latter part of 1924. It is claimed that both long and short chrysotile fibers are available here. The serpentine asbestos of Montana has probably been formed from chrysolite, amphibole, or pyroxene, and is, therefore, a secondary mineral.

BARITE

Uses—In pigments, as sizing for papers and textile fabrics, in manufacture of rubber, asbestos, cement and in tanning. Compounded with zinc sulphide used as pigment in white enamel paints, and in manufacture of linoleum and oilcloth.

Occurrence—Reported by Rowe on Pattee Creek, two miles southwest of Missoula, Missoula county; in Ruby Mountains, Madison county; on Cabin Creek, 25 miles southeast of Ekalaka, Carter county; on Cedar Creek, 25 miles from its mouth, in Wibaux county. Missoula deposit described as one of the best and purest in northwest and of commercial importance. Also reported near Stanford, Judith Basin county.

BENTONITE

Uses—Sizing for paper, absorbent in dynamite manufacture, retarder for gypsum plasters, constituent of a remedial dressing (antiphlogistine), adulterant in candies and drugs, de-inking of wood-pulp papers.

Occurrence—Reported six miles northwest of Hysham, Treasure county, in deposit five miles long and up to a mile wide, 10 to 30 feet in thickness.

BUILDING STONES

Uses—With a growing population and a rapidly decreasing timber supply, there must come an increasing use of stone and artificial building materials for building and public works. The essential qualities of building stones are strength, durability, workability, color and beauty.

Occurrence—According to Rowe, who has made the only survey of this resource, Montana is well supplied with many varieties of good building stones. East of the Rocky Mountains the stone is mostly sandstone; in the western part of the state, granite, quartzite, limestone and phyllite are the principal kinds of rock. In a few places, especially in the western third of the state, volcanic ash is used as a building stone. Rowe states a sandstone quarry is found at almost every town from Wibaux, in eastern Montana, to Livingston, 350 miles west, while from Helena west to the Bitter Root Mountains, both north and south, are found granite, phyllite, and quartzite in large quantities and at many localities.

Sandstone quarries are mentioned by Rowe in Beaverhead, Carbon, Cascade, Hill, Custer, Fergus, Sweet Grass, Stillwater, Yellowstone and Park counties. The Beaverhead, Stillwater and Yellowstone sandstones pronounced among the best in the state. Some of the best buildings in Salt Lake were constructed of Beaverhead county stone, and the softer purer white variety has been used as a flux at Anaconda. Rowe says this softer kind is without doubt the purest quartz sandstone in the state, and when crushed resembles glass sand, for which purpose it would undoubtedly be good. The original state capitol at Helena was built of Stillwater county sandstone.

Granite quarries are mentioned by Rowe in Lewis and Clark, Jefferson, Silver Bow and Ravalli counties. The wings of the state capital at Helena were constructed of Jefferson county granite.

The first colored quartzite in the state is probably found in Beaverhead county, according to Rowe, and the largest quantity in Missoula county. In Beaverhead county, he says, is found the best volcanic ash building stone in the state. Other counties

named as being among the chief producers of this stone are Gallatin, Rosebud, Missoula and Ravalli. The best quarry of phyllite or silicious slate is in Flathead county. This stone is also found in Missoula county.

CLAYS

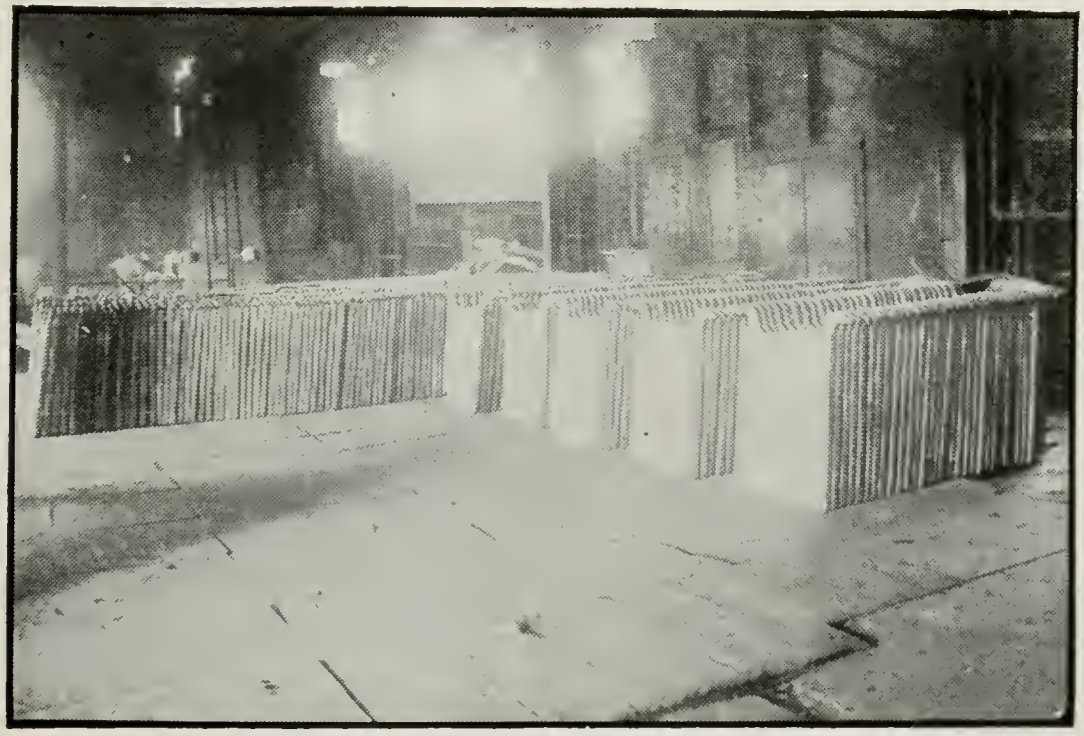
Uses—For pottery ware including porcelain, china, granite and earthenware, various kinds of brick, flooring, terra cotta in moldings and decorations, for irrigating and drain tile, water conduits, sewer pipes, ventilating flues. In the industrial arts for crucibles, retorts, furnace and stove linings, puddling hearths, smelting furnaces, glass pots, insulating materials in electrical engineering, filling for walls, sizing and filling for paper, cement manufacture, mineral paint and paint adulterants and experimentally in manufacture of aluminum. Among the most important kinds of clay are china clay, kaolin and indianaite, usually mixed with feldspar and used in whiteware, porcelain, tiles, insulators and for sizing and weighting paper. Ball clay and ware clay, a white burning plastic clay used in pottery industry to give strength and plasticity to the non-plastic clays. Fire clay, chiefly residual or sedimentary clay possessing high refractoriness, used in fire bricks, furnace linings, retorts, crucibles, tiles, terra-cotta pressed brick, etc. Much of the fire clay produced comes from beneath coal seams. Brick clays, impure plastic clays usually with a high percentage of fluxing impurities which cause them to burn to a hard product at a low temperature. Stoneware clay, a refractory or semi-refractory vitrifying clay of sufficient tensile strength and plasticity to be workable on a potter's wheel. Fire proofing and hollow brick clay should have rather high plasticity, fair tensile strength and should burn to a good hard but not vitrified body at a comparatively low temperature. Washed kaolin and certain fine-textured, fairly plastic sedimentary clays free from sand are used to give body, weight and firmness to various kinds of paper. Cement clay should contain 60 to 70 per cent of silica and the iron oxide and aluminum together should not exceed one-half the percentage of silica.

Occurrence—The only general survey of Montana's clay resources was made by Rowe. He reports deposits of brick clay at several places in Missoula, Sanders, Flathead and Ravalli counties, in Lewis and Clark, Silver Bow, Powell, Cascade, Rosebud, Yellowstone, Gallatin, Phillips, Valley, Park, Blaine, Hill, Beaverhead, Carbon, Granite and Fergus. The U. S. G. S. reports brick clay in Sheridan county.

Rowe reports deposits of fire clay in Powell and Jefferson and at two places each in Lewis and Clark, Cascade and Flathead counties.

Pottery clay is reported in Powell, Missoula and Gallatin counties, at several places in Sanders, Flathead and Ravalli counties, beneath coal veins in Fergus county, and possibly exists in Sheridan and Carbon counties. The clay in Carbon county may contain too much pyrites for pottery purposes, and the color of the Sheridan county clay may be objectionable.

The U. S. G. S. reports bed of clay between Plentywood and Redstone, Sheridan county, known extent of which is 18 miles east and west and eighteen miles north and south. Bed from three to eight feet thick. U. S. Bureau of Standards tested representative samples and reports the "clay appears to be a promising one for the manufacture of common and face brick and possibly drain tile and fireproofing. The buff color developed by burning would not permit its use in the manufacture of whiteware pottery. However, the clay has properties similar to those used in the manufacture of stoneware." The U. S. G. S. points out that the presence in the area of lignite will aid greatly in the exploitation of the bed and the manufacture of clay products and the report concludes: "Though the local demand for the clay products may not be



ANODES AT ANACONDA SMELTER

great, the association of lignite and clay, together with the advantages of location and transportation, may make the deposit valuable to the prospective manufacturer."

CORUNDUM (Industrial)

Uses—As an abrasive. Molded into wheels, whetstones, slips, hones and oil stones. Also used in powder of various degrees of fineness and made into abrading papers for polishing, stone and gem cutting and polishing, dental work, glass frosting and etching, and wood-working. In the gem form as a sapphire used for bearings in many delicate precision instruments, such as watches and various meters.

Occurrence—Reported by U. S. G. S. on headwaters of Elk Creek, 23 miles south of Belgrade, Gallatin county. Corundum-bearing rock eight to ten feet in width. Corundum crystals vary from fraction of an inch up to eight inches and have been found up to two pounds in weight. Concentrated in seams, some of the smaller ones consisting of pure corundum and the larger ones carrying 10 to 70 per cent corundum. U. S. G. S. says it is reported this deposit is a good abrasive, and a fire test proves it can be used in the manufacture of a vitrified wheel. Another deposit reported five miles west of this one and a third deposit 14 miles southwest of Bozeman.

Some time ago it was stated by the U. S. G. S. that "To the west of the Appalachian Mountains there are but four states in which corundum is authentically known to occur—namely, Montana, Colorado, Idaho, and California. The only localities of any commercial importance are those in Montana."

As a sapphire it is found in gravel deposits on Rock Creek, Granite county. This deposit is being worked and practically the entire output goes into industrial uses. (See Chapter on Mining.)

CRYSTALLINE LIMESTONES AND MARBLES

High grade deposits of marble are reported from a number of places in Montana. There has been practically no commercial production, however. Near Manhattan, Gallatin county, is a deposit of travertine onyx. Rowe reports the stone is of good grade and the product similar to the Mexican variety and that it takes a splendid polish. In Nelson Gulch, southwest of Helena, Lewis and Clark county, is reported a deposit containing seven distinct varieties of marble, Creoles, Sinais and Egyptian blacks and creams, white statutary marble, Carrara marble, blue marble, and Georgia white marble. It is reported a good quality of marble is found on Dempsey Creek, Powell county. Marble deposits are reported north of Lothair, Hill county; also near Townsend, Broadwater county, near Dewey, Beaverhead county, and near Garnet, Granite county.

A large deposit of variegated marble lays along the crest of a ridge near Townsend in Broadwater county. The deposit contains a large amount of black and gold marble, plain black, black and white together with other veined and banded marbles. Specimens of this deposit have taken a high polish. In this same area is also considerable grey marble suitable for building stone.

DIATOMACEOUS EARTH

Uses—Polishing powder, filter stone, wrapping pipes, fireproof cement, etc.

Occurrence—Flint Creek valley, Granite county; near Townsend, Broadwater county.

FLUORITE

Uses—Chiefly as a flux in manufacture of basic open hearth steel. Also as a flux in blast furnaces. Considerable quantity used in manufacture of glass and enameled ware; in electrolytic refining of antimony and lead; production of aluminum, and in manufacture of hydrofluoric acid.

Occurrence—Reported by U. S. G. S. in the Potosi mining district, 14 miles southwest of Pony, Madison county. Varies in color remarkably in this district, being purple, green, blue, white or black. Also reported near Mullan Pass, west of Skyline, Lewis and Clark county.

In 1919, 6,943 short tons of fluorite were imported into the United States.

FULLER'S EARTH

Uses—Used for scouring and cleaning cloth and more extensively for clarifying fats, oils and greases. Extensively used in refining petroleum. Coarser grades for coarse pottery, brick, tile and pipe.

Occurrence—Reported south of Baker, Fallon county, also in Silver Bow county.

GRAPHITE

Uses—Manufacture of crucibles and other refractory products, lubricants, lead pencils, paint, foundry facings, preparation to loosen boiler scale, polish for gun powder, and in electrical work. Largest quantity used in making crucibles, which for this purpose must be of the crystalline variety, with a content of graphitic carbon exceeding 85 per cent, and free from mica, pyrite and iron oxide. Amorphous graphite, which can be made in the electric furnace, is suitable for most other uses.

Occurrence—On ridge between Van Camp Creek and Timber Gulch, near southwest end of the Ruby range, 15 miles southeast of Dillon, Beaverhead county. The U. S. G. S. says development has not proceeded far enough to prove the existence of large deposits, but the prospecting done proves that considerable graphite, all of very high grade, occurs there. In another report says this deposit of the same type as the famous crystalline deposits of Ceylon. One mine producing. Also reported by Rowe three miles from Toston, Broadwater county.

GYPSUM

Uses—Wall plaster, gypsum plaster board, tile and bricks, insulating medium, retarder in Portland cement, fertilizer, blackboard crayon, base for paints, filler for cotton and most of the finer grades of paper, as a base for mixing with Paris green and other insecticides.

Occurrence—Cascade county near Millegan, Riceville, Goodman and Kibbey, in beds 3 to 6 feet thick. Fergus county, along north side of Little Belt Mountains, around the Big Snowy Mountains, encircling small dome near Hanover and probably encircling other structural domes, in beds 8 to 30 feet thick. In Jefferson county near Lime Spur. Carbon county, field extending from Bridger canyon southeasterly into Wyoming. Little explored. Beds 15 to 20 feet thick. Big horn county in the Red Valley, west of Lodge Grass Creek, three beds, 6, 60 and 50 feet thick. Madison county, two beds near Lyon, 10 to 20 feet thick. Park county, near Hunter's Hot Springs, occurs in veins 1 to 5 feet wide.

ICELAND SPAR

Uses—For optical purposes, especially in instruments for polarizing light.

Occurrence—In Sweet Grass and Park counties.

KAOLIN

Uses—Extensively used in manufacture of porcelain.
Occurrence—Reported found in Fallon county.

LIMESTONE

Uses—The most generally useful sedimentary rock. As building stones. As practically the only source of lime and indispensable in cement manufacture. As fluxing material in smelting industry. A pure limestone is extensively used in sugar-refining. A fine, compact, homogeneous limestone, which may be either a pure carbonate of lime or dolomitic, is used as lithographic stone. It is found, of a quality suitable for lithographic work, in only few localities. Two classes are known to the trade, the "blue" or hard stone, adapted to engraving and the better grade of fine-line printing and the "yellow" or soft stone, which is rated as somewhat inferior.

There are many different kinds of limestone. The kind most suitable for one industry may be the least adapted to another industry. For Portland cement an argillaceous (clay) limestone which contains lime, silica, and alumina, in such proportions that in the finished cement the ratio of lime to the silica, alumina and iron oxide taken together shall be not less than 1.6 to 1, or more than 2.3 to 1, is most desired. For every ton of limestone used in manufacturing industries, three tons are used as furnace flux.

Occurrence—This rock is abundant in the mountainous parts of the state. Its principal use up to the present time has been as a furnace flux in the smelters and in the manufacture of lime. The increased use of stucco for plaster has reduced the market for lime and kilns in a number of districts are idle. According to Rowe there are many deposits of good limestone in the state, but most of them are too remote from the railroads to permit profitable operation.

Rowe reports limestone in Lewis and Clark, Powell, Cascade, Fergus, Carbon, Beaverhead, Silver Bow, Jefferson, Sweet Grass, Gallatin, Park and Deer Lodge counties.

MICA

Uses—Indispensable in electrical industry as insulating material, in wireless apparatus, in magnetos. Also used in stove fronts, chimneys and lamp shades and sounding boxes of phonographs. Asserted the enormous expansion of the electrical industry due in large part to the unique properties of mica. To be of value as sheet deposits must yield a rectangle at least 1½ by 2 inches, which must split readily, be free from cracks, corrugations, etc. The only commercially valuable varieties in the United States are muscovite (common) and biotite (black mica).

Occurrence—U. S. G. S. quotes report of prospect eight miles southeast of Dillon, Beaverhead county, that is said to have yielded plates 8¼ by 18¾ inches. Another prospect was reported near Barker, Cascade county, in a bed four feet thick. Also reported on Granite Creek, between Virginia City and Sheridan, Madison county. Mica said to be of good quality, clear and well grained. Also reported on property of Zonolite Mining Company, near Libby, Lincoln county.

NITRATE

Uses—Chiefly as fertilizer and in manufacture of explosives.

Occurrence—U. S. G. S. reports deposit of niter along face of cliffs of black limestone, on Camp Creek, three and one-half miles northeast of Melrose, Madison county. No explorations to determine if potash and soda nitrates are included in the limestone back from the outcrop. Estimated would require 35 tons of rock to be treated to obtain one ton of crude salts.

OIL SHALE

Uses—Source of power, light and lubricants, and, when it is a phosphatic oil shale, as in southern Montana, is a source of fertilizer.

ROW OF CONVERTERS AT ANACONDA SMELTER

Occurrence—Dillon-Dell area, Beaverhead county, richest beds of phosphatic shale, 3 feet or more in thickness, yielded 25 to 30 gallons of oil to the ton. The United States Geological Survey, in its report on this field, says scant encouragement can be given the hope that the shale of this area can be successfully exploited for its oil yield. . . . . It adds, however, that if on further investigation the merits of "Tetraphosphate," a fertilizer manufactured in Italy, are established, "the process could readily be carried on in conjunction with the distillation of the oil shales in the Dillon-Dell area."

PHOSPHATE

Uses—In largest quantity as ingredient of artificial fertilizers, finely ground, directly as a fertilizer, also used for making phosphoric acid and phosphorus. Phosphorus used in phosphor bronze, phosphor copper and phosphor tin, in incendiary bullets, smoke screens, matches, and striking surface on boxes of safety matches.

Occurrence—Reported by the U. S. G. S. in Granite, Powell, Lewis and Clark, Beaverhead and Jefferson counties. Detailed reports have been made on all of these deposits except the one near Cardwell, in Jefferson county. They show the deposits examined are workable and high grade, containing 60 per cent or more tricalcium phosphate. The deposits are easily accessible from Maxville, Garrison, Elliston and Melrose, at a distance of one to six miles from the railway. The Montana deposits, with those found in Idaho, Utah and Wyoming, constitute the largest phosphate beds in the world, so far as known. They are of a higher grade than those found in Florida and South Carolina which have been the principal source of phosphate in this country up to the present time. The U. S. G. S. estimates there are nearly six billion tons of high grade phosphate available in the United States of which five and a half billion tons are found in Montana, Idaho, Utah and Wyoming.

SLATE

Uses—About three-fourths of the slate produced in this country is for roofing purposes. Mill stock includes blackboards, flooring, wainscoating, mantels, hearths, switchboards, vats, sinks, laundry tubs, sanitary ware, grave vaults, tops for laboratory, billiard and kitchen tables. Waste is used for road material and flagging. Slate veneer, a built-up material, recommended for roofing.

Occurrence—Four miles east of Mitchell, Lewis and Clark county. Some development has been done on this deposit and machinery installed for making shingles, blackboards, switchboards, table tops and other flat work.

SOAPSTONE

Uses—The most generally known use is in hot-cake griddles. An ingredient of some lubricants, and utilized in a variety of other ways.

Occurrence—Reported by Rowe in a coal mine four miles southeast of Gilt Edge, Fergus county, and in a coal mine seven miles from Forsyth, on Smith Creek, Rosebud county. Bed four feet in thickness reported by U. S. G. S. in coal mine at Aldridge, Park county.

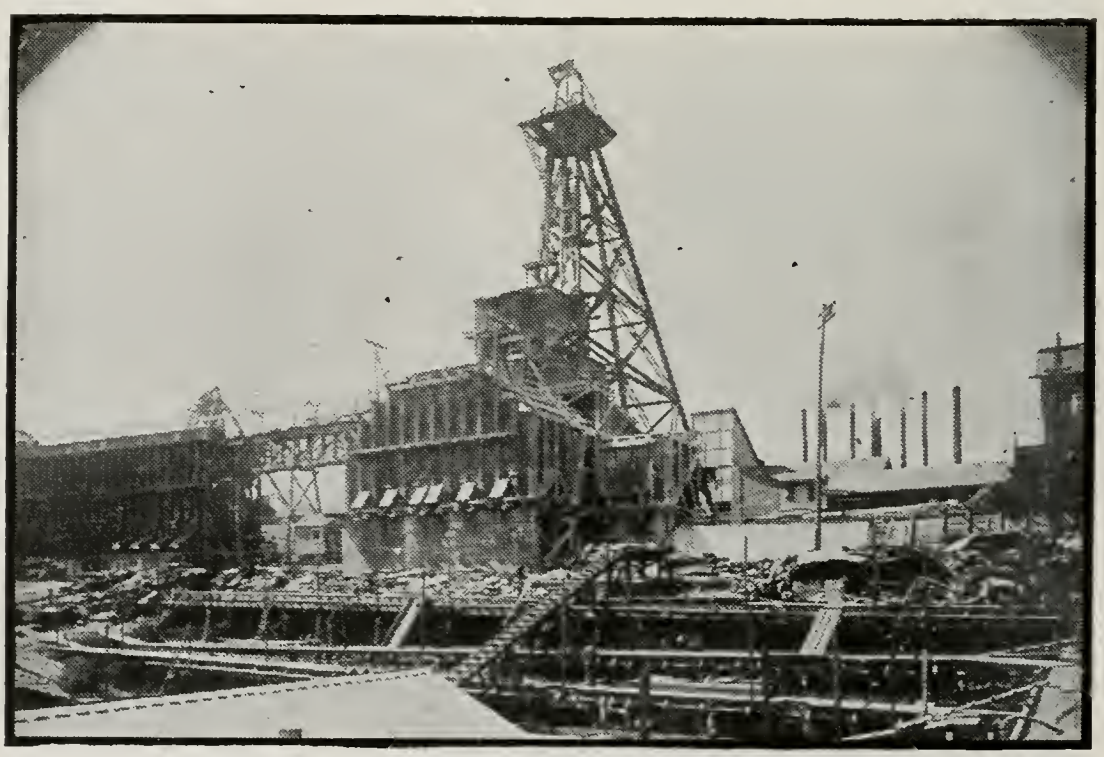
SULPHUR

Uses—In making sulphuric acid and paper pulp, as a fungicide or insecticide in agriculture, and in certain explosive powders. More than half the total production converted into sulphuric acid which is used in fertilizers, in refining petroleum, in pickling and galvanizing steel, and in making chemicals and drugs.

Occurrence—As a by-product from the smelters in Deer Lodge and Lewis and Clark counties.

ZONOLITE—See Chapter on Mining in Montana.

FORESTRY RESOURCES—See Chapter on Lumbering in Montana.



A BUTTE MINE HOIST, ORE BINS AND PRECIPITATION PLANT

COAL MINING

With Aid of Electric Shovels Each Employee Averages 50 Tons Per Day at Colstrip—Montana's Extensive Coal Measures.

The coal measures of Montana are among the most extensive in the country. Of the 1,051,291,000,000 tons of lignite lying within the boundaries of the United States, the United States Geological Survey reports that 381,000,000,000 tons, or more than one-third, is found in Montana.

In addition to this huge amount of lignite**, the state contains extensive deposits of bituminous coal, as shown on the accompanying map.

The coal reserve of the state, including all kinds, is estimated at 409,000,000,000 tons. This is 11.5 per cent of the total coal reserves of the United States and eight per cent of the total reserves of the world.

Nearly every section of the state shows coal deposits of greater or less extent.

Good bituminous steam coal is found at several points, notably in the Great Falls, Lewistown, Bull Mountain and Red Lodge fields.

Small deposits of coking coal are found in the Trail Creek, Electric and possibly the Ruby field.

Sub-bituminous coal, suitable for producer gas or for steam coal with special grates, occurs quite generally throughout eastern Montana.

The coal of Montana is of varying grades, which may be classified as follows:

1. Lignite—Distinctly brown and either noticeably woody or clay-like in appearance. Of low heating value, slacks readily and completely. A good fuel for producer gas but cannot stand long transportation.
2. Sub-bituminous—Distinguished from lignite by its black color and apparent freedom from woody texture, and from bituminous by its loss of moisture and consequent slacking. Will not stand distant shipping but is a clean domestic fuel and excellent for making gas.

COAL FIELDS OF MONTANA

3. Bituminous—This is a coal in which the volatile matter and the fixed carbon are nearly equal. Only slightly affected chemically by weathering unless exposed for years. Many of the better coals of this group will coke.

**Much of the lignite in Montana has been classified by geologists as "sub-bituminous" and is so indicated on the map.

The coals of eastern Montana are mainly lignite, changing to sub-bituminous toward the mountain uplifts of the Big Horn and other outlying spurs of the Rockies. In the mountains themselves, coking coals are occasionally found.

The seams range from one inch to fifty feet in thickness but most of the mining is on veins measuring from four to fifteen feet. Except for local use, the smaller widths are unprofitable anl larger widths are found only in rare instances.

Active Coal Fields.

Of the score or more commercially potential coal areas in Montana, four are at present being actively and extensively worked. These are the Sand Coulee district in Cascade County, Red Lodge area in Carbon County, Roundup field in Musselshell county and the recent extensive strip mining operations at Colstrip, 30 miles south of Forsyth, in Rosebud County.

The Sand Coulee operations lie in what geologists term the Great Falls field, which includes the Sand Coulee basin, covering 231 square miles, the Otter Creek basin, 37 square miles, and the Sage Creek basin, 66 square miles. The Hound Creek district may be regarded as another such basin in the Great Falls field.

The best coal is found in the Sand Coulee basin, where it runs from four to 15 feet in thickness, with few and narrow partings. Extensive mining has been carried on in the vicinity of Belt and Sand Coulee-Stockett. The principal operations at present are those of the Anaconda Company at Sand Coulee. Prospects have indicated a third possible center on Smith River. Between the Belt and Sand Coulee areas is an interval of ten miles, in which the coal, if present, is covered by 100 to 200 feet of overlying formation. From there to Smith River is a 17-mile interval in which the coal lies from 200 to 500 feet below the surface. Future search in the Great Falls field is most promising in these concealed areas between points of known valuable coal deposits.

Roundup.

In the so-called Bull Mountain field, between the Musselshell and Yellowstone rivers, 26 separate beds have been recognized, named and mapped by the United States Geological Survey. The four principal ones are the Mammoth-Rehder, the

ANACONDA FIRST AID TEAM

Dougherty, the Roundup and the Snelling-McCleary. The Mammoth-Rehder, the area of nearly two hundred square miles, around whose edge the out-cropping coal runs from six to 16 feet in thickness. It could readily be reached by railroad spurs. The Mammoth seam yields a good grade of bituminous coal, with fair fuel value and of low ash and sulphur content.

The Dougherty seam, just to the east, runs only from one and one-half to three feet in thickness and is not quite as good coal as the Mammoth.

The Snelling-McCleary seam, located on the extreme eastern edge of Bull Mountain field, is second only to the Mammoth in width and, as far as thickness is concerned, can be mined over a large portion of its outcrop. The grade is equal to that of Mammoth.

Near the city of Roundup, extensive development of the coal beds has been under way for several years, this being a source of fuel supply for the locomotives of the Chicago, Milwaukee, St. Paul and Pacific Railway, and for domestic use throughout the State. Here the seam is about six feet thick and the coal has a satisfactory fuel value.

The best coal remaining to be developed in the Bull Mountain field lies in the Mammoth and the Snelling-McCleary seams, both of which promise large tonnages of easily mined, wide bituminous coal of about 11,500 B. T. U. fuel value.

Red Lodge.

The Red Lodge field covers the coal districts of Carbon and Stillwater Counties. The chief of these are the Red Lodge, Bear Creek, Bridger, Silvertip and Nye districts. The Bridger district is on Clark's Fork, the Red Lodge district is on Rock Creek, the Bear Creek on the stream of that name, the Silvertip is ten miles southeast of Bear Creek and the Nye district is on the upper Stillwater.

At Red Lodge, eleven workable coal seams, containing an aggregate of over 70 feet of coal, are found in 800 feet of strata. At Bear Creek eight seams contain 50 feet of coal in 600 feet of the formation. Within this area are about 1,250,000,000 short tons of good grade sub-bituminous coal, all within mineable depth.

THE ELECTRIC DRAG LINE STRIPPER, WITH ITS 155-FOOT BEAM, REMOVES THE OVERBURDEN AND EXPOSES THE COAL

Coal in the Red Lodge district is being mined at present by the Northern Pacific railway at Red Lodge, by the Anaconda Copper Mining company at Washoe and by several companies at Bear Creek.

Rosebud.

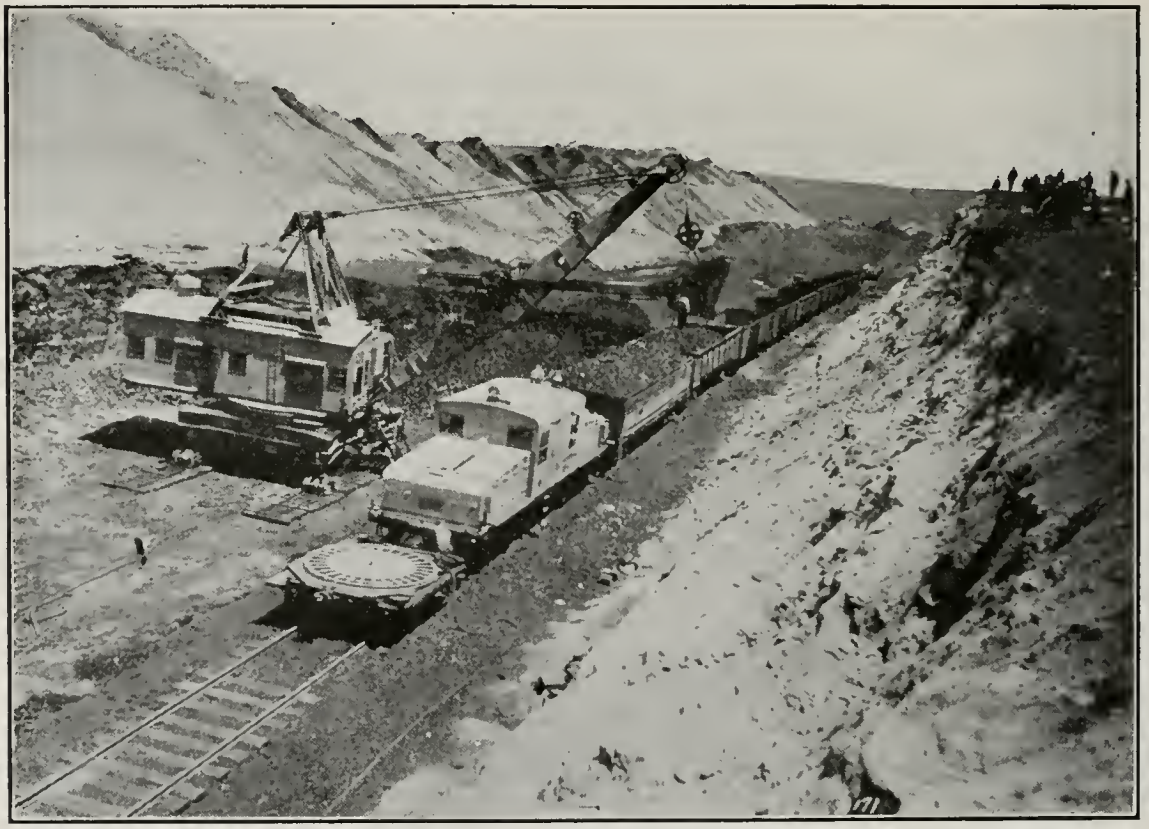
In 1913, the Northern Pacific railway made a general geological examination of the large sub-bituminous coal vein in south central Montana known as "The Rosebud field." It was found that this vein underlies an area of 700 square miles in Montana, running over into Wyoming, and that the full thickness of the vein is 28 feet. It is estimated that there are at least six billion tons in the Rosebud vein within the State of Montana.

As a result of the further intensive examination of 15 square miles on the northerly edge of the field, it was found that no less than 90,000,000 tons of mineable coal lay beneath 100 feet or less of overburden. The report recommended the construction of a railroad from the main line of the Northern Pacific, near Forsyth, 30 miles directly north of the field, and the mining of coal by open cut, power shovel methods.

To determine the value of this coal for locomotive fuel, 400 tons were mined and tested with satisfactory results, after allowing for certain changes in drafting and firing. When it was estimated that the Northern Pacific railway would save at least $700,000 annually by substituting Rosebud for Red Lodge coal as locomotive fuel over the territory between Mandan, N. D., and Missoula, the Board of Directors authorized the construction of the branch railway and the opening of the field. Work was begun in the spring of 1923, the track reaching the field in December of that year.

The contract for mining the coal was awarded to Foley Brothers of Minneapolis. Necessary equipment was bought and installed and full-time operations were in full swing by 1925.

After thorough consideration, electrical operation was chosen as the only reliable method of handling the field. Arrangements were made with the Montana Power Company, which in 1924 built a power line from Billings through Hardin to the field, a distance of 100 miles. Foley Brothers installed an electrically



The Electric Shovel Then Lifts the Coal in 8-Ton Mouthfuls Into the Cars, Which Are Hauled to the Railroad by Electric Locomotives

operated drag line and shovel and a pair of 60-ton storage battery locomotives.

A model village and railroad station, bearing the name of "Colstrip," were constructed, the village buildings including a recreation hall, two garages, septic tank sanitary system, fourteen cottages for skilled employees and their families, two-room school building and an office building.

The operations involve the use of considerable equipment which is unique in the history of strip mining. Among these are the largest drag-line stripper ever built and a machine for lifting coal which operates the largest shovel ever constructed for that purpose.

The giant drag-line excavator is big enough to dig out an excavation for a home with only a few scoops and in a few minutes, conveying the dirt a block and a half away.

The coal shovel lifts enough coal at one time to supply the season's needs for an entire family—seven to eight tons—directly from the coal vein to a coal car, in one operation. All this it does in three-quarters of a minute.

The job calls for only 60 or 70 men to perform the work, where hundreds would be required in an underground mine. It permits each employee to average 50 tons production per day, whereas eight to ten tons are considered a good day's work per man in underground mining.

The operation at Colstrip consists merely in removing the overburden of soil, piling it to one side and then removing the exposed coal by power shovels directly to the cars, in which it is hauled to various distributing points on the Northern Pacific system.

Operations began at the north edge of the field, where a pit 8,000 feet long and 900 feet wide, containing 7,000,000,000 tons of coal, was laid out.

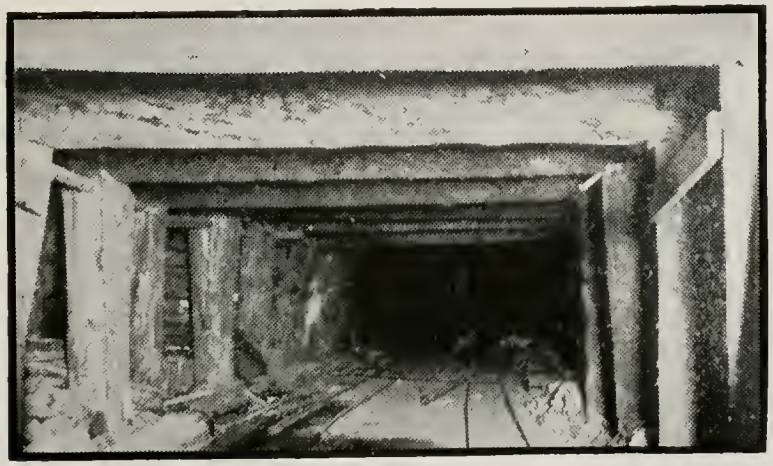
The first cut was 125 feet wide on the bottom and here the stripping and coal mining is being continued back 8000 feet.

The first coal was taken from the pit for test on locomotives. One hundred thousand tons were made available. Steam locomotives were used to haul the coal from the pit to Colstrip, a distance of about two miles. Lack of water and danger from fire in the coal pit from steam locomotives resulted in purchase by the contracting company of electric locomotives, for the first time in America making mine operations entirely electrical.

What this mine operation represents in economy is shown in comparison with underground operations. No horses are required for operation. Electric power does the entire work, save for a few men. Opening of the strip mines has also brought many economical changes to the operating department of the railroad.

The railroad company today, in its Rosebud operations, is saving from $1.50 to $2.00 per ton on its coal, compared with the bituminous product it has previously obtained from its two underground mines. In steam producing value, the Rosebud coal is only 20% less effective than the soft coal previously used by the Northern Pacific.

If the Northern Pacific's annual consumption reaches 1,500,000 tons, the company will be in a position to save in a single year between $2,000,000 and $3,000,000 on its coal bills, or enough to pay for the entire installation at Colstrip. At present some 40,000 tons are being mined each week.



A MINE TUNNEL

PETROLEUM AND NATURAL GAS IN MONTANA

By J. P. ROWE.
Professor of Geology, State University, Missoula, Montana.

Oil! What a word with which to conjure! It is like the word gold when we hear that some one has struck the natural product. Like gold, around its discovery and development many a romance has been enacted. It is a term whose natural products have made many a man wealthy for life, and it is also a term that is used by the unscrupulous to sell bad bargains in the shape of oil stock. Many, many people will buy oil stock without investigation, that would not put their money into other safer investments. But prospecting for oil and drilling for oil and refining of oil is a very legitimate and much-needed business. Like any other business, there is hazard in it. It is only made more hazardous by some dishonest salesmen.

At the present time, the "American Oil industry stands among the foremost of American industries." It is estimated that in its various branches some 750,000 persons are employed, and it represents an investment of more than $9,000,000,000. The persons having investments in the oil industry number many hundreds of thousands.

The industry performs a duty very important to the national life and welfare.

Some call the present time "the motor age." If the products of petroleum were taken from the markets tomorrow, the business of the United States would be paralyzed. More gasoline and more other products of petroleum are being used each year. While 1927 saw the largest production of crude oil in the United States and possibly the largest production that will ever be, it undoubtedly did not see the largest consumption that will be. While the year 1927 was the banner year so far for consumption, without question 1928 will see a consumption in advance of 1927 by many per cent. During the year 1927, it is estimated that the United States produced over 905,000,000 barrels, of 42 gallons each, of crude oil. In the same year it consumed over that number of barrels, and right now the country is drawing on its reserves that have been stored during the past few years.

The Nation's Supply.

In order to get an idea of the nation's future supply of petroleum, the American Petroleum Institute appointed a committee of 11 members to cooperate with the federal oil conservation board. The board of directors of the institute authorized the publication of the committee's report, and, consequently, a book entitled "American Petroleum, Supply and Demand" appeared, published by McGraw-Hill company of New York City. Parts of this report are very interesting and illuminating, and, as the supply and demand of petroleum in the United States has a bearing on the Montana products, they will be given below. Quoting from the "Summary of Conclusions" on page 3 of this report, it says:

1 "There is no imminent danger of exhausting of the petroleum reserves of the United States." This statement is probably true, but the day of cheap motor fuel will not long continue if it has not already passed.

2. "It is reasonable to assume that a sufficient supply of oil will be available for national defense and for essential uses in the United States beyond the time when science will limit the demand by developing more efficient use of or substitute for oil, or will displace its use as a source of power by harnessing a natural energy." Along this line the report says, "Automotive experts state that mileage of the motor car per gallon may be doubled through structural mechanical changes, when price justifies such changes." "The supply of gasoline will be augmented still further by the 'cracking' of fuel oil."

"Petroleum recoverable by present methods of flowing and pumping from existing wells and acreage thus proved consists of 5,300,000,000 barrels of crude oil." The U. S. Geological Survey not long ago estimated that there were 9,000,000,000 barrels of oil in the ground in the United States, but it is now being taken out at nearly a billion barrels per year.

"It is estimated that after pumping and flowing there will remain in the area now producing and proved 26,000,000,000 barrels of crude oil, a considerable portion of which can be recovered by improved and known processes."

"Deep drilling below sands now producing will disclose in many areas deposits not hitherto available, which will be the same as the discovery of new fields." California has recently finished an oil well that is in the neighborhood of 7,500 feet deep. It is now thought that drilling an oil well 10,000 feet is possible, or soon will be.

"There are in the United States more than 1,100,000,000 acres of land of geological formation favorable to the presence of oil."

Shale Possibilities.

"An estimate that there are within the United States 394,000,000,000 tons of oil shale, from which about 108,000,000,000 barrels of crude oil can be recovered, yielding 25,000,000,000 barrels of motor fuel.

"A minimum estimate of 525,000,000,000 barrels of liquid products from the country's deposits of coal, yielding an estimated 92,000,000,000 barrels of motor fuel.

"An estimated yield of 70,000,000,000 barrels of liquid products from the country's lignite deposits, 12,000,000,000 barrels of which could be used as motor fuel."

The amount of coal and lignite that can be recovered in the United States is placed at approximately 2,641,260,000,000 tons.

The estimated maximum oil recovery would be 2,095,400,000,000 barrels. The smallest estimate of motor fuel recovery is 92,010,000,000 barrels and the maximum 392,640,000,000 barrels.

One does not quite understand the cry of oil shortage. However, one must remember that but about 6,000,000,000 barrels of crude oil are available by present extraction methods. When other methods are used, then the price begins to rise. Therefore, the reason for the statement, "the days of cheap oil are nearly over."

Possibilities in Montana.

So much for supply and demand of oil in the United States. A brief discussion of petroleum and natural gas in Montana will be given.

The United States did not become a commercial crude oil producer until the year 1859. That year there were produced about 2,000 barrels. Montana did not become an oil producer until 1915 when the first well was brought in. This well was in the southern edge of Carbon county in what is known as the Elk Basin structure. Montana did not enter the real list of producers of crude oil until the year 1921 when 1,509.000 barrels were produced. Each year has seen an increase until more than 4,000,000 barrels of crude were produced in 1925. The total production of oil in Montana up to January 1, 1926, exclusive of the early years of production from Elk Basin, amounts to 13,016,046 barrels, valued at $19,556,784. This increased to 25,623.251 barrels, valued at $36,562,463, up to January 1, 1928. There are eight localities where commercial petroleum has been brought in in Montana. A brief discussion of each of these localities or fields is given below.

The Montana Fields.

1. ELK BASIN—Carbon county, Montana, and Park county, Wyoming. This structure became a commercial producer in 1915. However, as there are few producing wells in the Montana side, the production has amounted to little in Montana's total. This locality produced 17,199 barrels in 1927, valued at $25,210.

2. DEVIL'S BASIN—Musselshell county. A well in this structure was brought in in November, 1919. The oil was a heavy oil and doubtless came from the Quadrant formation. There are at present three successful oil wells in this locality, but, owing to the fact that the oil is heavy and the district such a long distance to a railroad, there is not much activity in the field, although some drilling was reported for 1927. Most of the oil produced is hauled to Roundup in tank wagons and shipped to Butte on the C., M., St. Paul and Pacific Railway for fuel purposes.

3. CAT CREEK—The first real commercial locality developed wholly within Montana territory was this structure. Drilling on a minor structure of the Cat Creek anticline, known as the Mosby dome, a very high grade paraffin oil was struck during the spring of 1920. The Cat Creek anticline extends northwest—south-

west from Black Butte, an eastern laccolith mountain of the Judith Mountains, to and beyond the Musselshell river. Along the crest of the anticline are several upwarps or structural highs or domes. The easternmost of these upwarps has three minor structures or domes, known as the East Mosby, Mosby and West Mosby domes. The Cat Creek discovery well was in the Mosby dome. Later development, however, in the West Mosby structure proved that it was by far the most productive. Other structures north and west of the Mosby structures have been drilled, but as yet with no success. There are about 175 producing wells in this field yielding a little more than 3,000 barrels of crude oil daily. The oil from this field is run through pipe lines to Winnett, where it is loaded into tank cars and shipped to refineries both in Montana and outside. Some of the crude has been shipped as far east as Whitney, Indiana.

4. SOAP CREEK DOME—Next discovery of oil in the state was in Big Horn county, in the Soap Creek dome, 28 miles south and west of Hardin on the Crow Indian reservation. The oil found here is a heavy black oil, comes from the Quadrant sands and is struck about 1,700 feet below the surface. It is reported that there are five wells producing from this field, but at present none being drilled. Due to lack of transportation facilities, there is not much activity at present in this field. There are several structures described in the Crow Indian reservation in Bulletin 736-B of the United States Geological Survey. This bulletin was written by W. T. Thom, Jr., of the survey.

5. KEVIN-SUNBURST FIELD—This lies in Toole county, about 20 miles north of Shelby and 15 miles south of the Canadian boundary. This field was brought in in March, 1922, by what is known as the Gordon Campbell Discovery well. Although this well made possible, through its discovery of oil, the immediate development of the greatest oil field in Montana, it can hardly be classed as a successful well due to the fact that but a few barrels of oil per day are pumped from it. The oil in this field comes largely from a thick "sand" that marks the base of the Ellis (Jurassic) and lies unconformably upon the Madison (Lower Pennsylvania or Mississippi) limestone.

According to the United States Geological Survey, "the oil from the Ellis formation is nearly black and has an odor of sulphur and an average gravity of about 30 degrees Baume."

According to recent reports May 26, 1928, there are 907 producing oil wells in the Kevin-Sunburst field and the daily production is about 10,000 barrels. Due to the recent increase in price of the Kevin-Sunburst crude oil to $1.65 per barrel in addition to a premium of 10c per barrel, great activity is going on in this field. Thirteen new wells were started here during the week of May 26, 1928. It is estimated in all that there are 52 active operations in the field today. These wells will strike oil sand at about 1500 feet at a cost of from $6500 to $8000. The wells can be drilled in from two to three weeks, and it is estimated, according to past drilling, that seven out of ten wells will be producers.

This field has a great deal of promise for the future. Some very large producing wells have been brought in recently and each month seems to make things look brighter and better.

6. LAKE BASIN FIELD (Big Lake)—In May, 1924, the Midwest Refining company, operating on section 26, township 1 north, range 21 east, Stillwater county, brought in a flowing well rated at 2,000 barrels flush production. This structure is known as the Big Lake structure. The first successful well to be brought in on this structure is known as the Hepp No. 1. The producing sand in this well was reached at a depth of 3,880 feet. It is claimed that the oil has a Baume gravity of 42.5 and is therefore a good gasoline product. This area was formerly known as the Battle Butte district, and the Midwest Refining company is reported to have virtual control of almost the entire area.

There are at present 10 producing wells in the district with considerable activity shown. There are 22 wells already drilled or being drilled, or rigs up or being constructed on the Big Lake structure. It is stated that this locality produced 29,809 barrels of crude oil in 1927, valued at $68,691. It is a promising locality and 1928 should see much development and a large production from the Big Lake district.

7. PONDERA FIELD—This field in Pondera and Teton counties was brought in during 1927. The field now has two producers and several wells drilling. The newest big well to be brought in in this field is the Continental Development company No. 1, Gjullin well. This well promises to be one of the biggest in this section of the country. The oil sand was struck at 1,887 feet. Many wells will be drilled in this structure during the coming summer. It gives great promise for the future. Most of the wells drilled in the Pondera structure are in township 27 N., range 4 W.

8. BANNATYNE—This field was also brought in in 1927. It is located in Pondera and Teton counties. The chief producing wells are located in township 25 N., range 1 E. Sections five and eight are the chief localities. At present there are five producing wells in the Bannatyne structure. Many wells are being drilled at the present time, and this structure looks like a great producer in the near future.

A year or two ago it was claimed that drilling for oil was going on in 35 counties in the state. That does not say that drilling was being done in the most favorable localities. Commercial oil or gas is not looked for in the following rocks:

1. Igneous rock—There are a few exceptions to this but not many.
2. Quartzite and other metamorphic rocks.
3. Proterozoic rocks.
4. Rocks of fresh water origin.

Valleys like the Bitter Root valley, Ravalli county; Missoula valley, Missoula county; Flathead valley, especially below the lake in Lake county, and in fact most, if not all, localities west of the continental divide are not good localities to drill for oil. Conditions are not right. If the rocks are younger than the Proterozoic and of marine origin, as they are in some of the western valleys, the mountain making has so shattered the rocks that an accumulation of oil in commercial pools is practically impossible.

Refining.

Practically all of the commercial crude produced in Montana today is a fairly high gravity oil and is used in making gasoline, kerosene, and fuel oil. So far as the writer knows, no lubricating oil is manufactured from the Montana crude. This is especially true of the Montana independent refineries. The refineries in the state either are skimming or topping plants. The simple method is to run off the gasoline and then the kerosene and use the remainder for fuel.

The following is a list of independent refineries of any size that have been built in Montana so far. As will be seen, most of them are in operation at present:

The list given is up to January 1, 1928, taken from circular No. 6065, Department of Commerce, Bureau of Mines, printed and circulated in April, 1928.

Status	Company	Railroad	Location	Daily Capacity	Type of Plant	Year Built
Op.*	Arro Oil & Refg. Co.	G.N.; C.,M.,St.P.&P.	W. Lewistown	2,600	Skim.	1921
Op.	Big West Oil Co.	G.N.	Kevin	500	Skim.	
Op.	Blue Bird Oil & Refg. Co.	B.,A. &.P.	Butte	150	Skim.	1926
Op.	Hart Refineries	G.N.	Hedgesville	100	Skim.	1922
Op.	Hart Refineries	C.,M.,St.P.and P.	Missoula	300	Skim.	1924
Op.	International Refg. Co. (Calif. Pet. Corp.)	G.N.	Sunburst	12,000	Skim.	
Op.	Lewistown Oil & Refg. Co.	C.,M.,St.P.and P.	Lewistown	2,100	Skim.	1921
SD**	Milk River Refineries, Inc.	G.N.	Havre	500	Skim.	
SD	North Am. Oil Refg. Trust	G.N.	Kalispell	400	Skim.	
SD	Rainbow Oil Co.	G.N.; C.,M.,St.P.&P.	Great Falls	500	Skim.	
Op.	Reliance Refg. Co.	G.N.	Kalispell	1,000	Skim.	1924
SD	Roundup Refg. Co.	C.,M.,St.P.and P.	Roundup	50	Skim.	
Op.	Shelby Pipe Line & Refg. Co.	G.N.	Shelby	750	Skim.	
Op.	Silver Bow Refg. Co.		Butte	300	Skim.	1925
Op.	Snow Cap Oil Co.	G.N.	Sunburst	700	Skim.	1923
Op.	Sunburst Refg. Co.	G.N.	Great Falls	3,000	Skim.	1923
Op.	Toole County Refg. Co.	G.N.	Kevin	200	Skim.	
Op.	Yale Oil Corp.	C.,M.,St.P.and P.	Miles City	800	Skim.	1922
			TOTAL	25,950		

* Operating.

** Shut Down.

Skim. Skimming Plant.

Montana Oil Production, 1921 to 1927, Inclusive.

Year	No. Producing Wells	No. Bbls. Produced	Value
CAT CREEK			
1921	56	1,350,528.91	$ 2,085,296.97
1922	97	2,201,917.04	3,366,529.58
1923	141	2,080,826.12	3,360,785.79
1924	179	1,529,202.19	2,439,277.76
1925	186	1,234,456.28	2,419,125.79
1926	164	1,003,233.00	2,163,659.00
1927	164	775,699.07	1,145,166.49
TOTAL		10,175,862.61	16,979,851.38
KEVIN-SUNBURST			
1921			
1922	27	28,987.48	40,582.49
1923	146	441,531.48	309,072.03
1924	220	1,187,404.84	1,168,329.95
1925	438	2,736,938.36	3,944,258.10
1926	658	6,463,352.00	7,765,572.00
1927	860	4,205,935.23	5,680,622.53
TOTAL		15,064,149.39	18,908,437.10
LAKE BASIN			
1925	2	23,590.27	49,828.81
1926	10	49,522.00	115,546.00
1927	10	29,809.32	68,691.46
TOTAL		102,921.59	234,066.27
ELK BASIN			
1921	22	75,178.86	128,370.27
1922	22	47,011.10	75,895.92
1923	22	28,085.39	45,250.45
1924	22	24,019.14	39,280.87
1925	22	21,286.46	51,144.39
1926	22	18,454.00	41,212.00
1927	22	17,199.78	25,210.33
TOTAL		231,234.72	406,364.23
SOAP CREEK			
1921	5	14,719.66	7,982 81
1922	5	27,134.80	14,831.65
1923	5	1,960.00	980.00
1924	5	Field Shut Down	
1925	5	" " "	
1926	5	" " "	
1927	5	" " "	
TOTAL		43,814.46	23,794.46
DEVIL'S BASIN			
1921	1	3,047.00	6,094.00
1922	1	1,363.50	2,727.00
1923	1	753.00	972.00
1924	1	105.00	157.50
1925		Field Shut Down	
1926		" " "	
1927		" " "	
TOTAL		5,268.50	9,950.50
BANNATYNE			
1927	2		
ALL FIELDS			
1921	84	1,443,474.43	2,227,744.05
1922	152	2,306,413.92	3,500,566.64
1923	315	2,553,155.99	3,717,060.27
1924	427	2,740,731.17	3,647,046.08
1925	653	4,016,271.37	6,464,367.09
1926	859	7,534,561.00	10,085,989.00
1927	1063	5,028,643.40	6,919,690.81
TOTAL		25,623,251.28	$36,562,463.94

Natural Gas.

Montana bids fair to become rather a large producer of natural gas. At present there are a number of localities in the state where gas has been struck but not yet used in a commercial way. Natural gas is a great boon to those in Montana who have it accessible. The heat value of natural gas and artificial gas is more than two to one in favor of the natural product. The matter of price is also a big factor. The city of Billings pipes its natural gas about 68

miles and sells it for 50 cents per thousand cubic feet, as against $2.20 per thousand paid for artificial gas at Missoula.

At present there are nearly a dozen cities in Montana using natural gas and about that many localities that produce natural gas in large enough quantities to be commercially valuable. The following are some of the cities using natural gas:

GLENDIVE–BAKER STRUCTURE (Cedar Creek Anticline).

GLENDIVE—Gas was discovered and used in this city for the first time in 1913. Glendive also has the distinction of being the first city in Montana to use commercially natural gas. The wells are on the northern end of the Cedar Creek Anticline. One or two steps have been taken to pipe the gas from Glendive to Sidney and then to Williston, N. D., but nothing definite has as yet been done.

BAKER—The gas field located in the vicinity of Baker is called the Glendive-Baker structure, and consists of a series of six domes starting at a point about nine miles south of Glendive and running to a point about thirty miles south of Baker, or a total distance of about sixty-five miles. The names of the six domes, from north to south, are Ash Creek Dome, Cabin Creek Dome, Baker Lookout Dome, Hidden Water Dome, Little Beaver Dome, Fox Hills Dome, and Gallop Creek Dome. This field is recognized as one of the largest existing Natural Gas Fields in the United States.

Gas was first discovered at Baker about fifteen years ago when it was encountered in the drilling of a water well near there. Since its discovery the residents of Baker have been using natural gas and the Carbon Black Company was erected at Baker and has been using the gas at the rate of four million cubic feet per day for the past thirteen years.

The development of the gas field by the Minnesota Northern Power Co. started two years ago and most of the drilling to date has been on the Cabin Creek Dome which has produced the largest wells so far on the Glendive-Baker structure. The Minnesota Northern Power Company now has ten producing wells on the Cabin Creek Dome with an open flow capacity of over one hundred million cubic feet. The Minnesota Northern Power Company has also drilled two wells on the Hidden Water Dome in the vicinity of Marmarth, North Dakota, these wells being of smaller capacity than those of the Cabin Creek Dome.

The Johns-Hagen Company has drilled several wells on the Ash Creek Dome and are continuing their drilling operations this year.

During the summer of 1926 the Minnesota Northern Power Company built a 40 mile 8″ pipe line from the Cabin Creek Dome into Glendive, Montana, and has been serving Glendive with natural gas service since that time, as well as using natural gas in the power plant of the Montana-Dakota Power Company located at Glendive.

In the summer of 1927 an 8″ pipe line was built from the Cabin Creek Dome through Terry, Montana, to Miles City, and natural gas has been distributed in those two towns since the 15th of August, 1927. During the same summer a 4″ pipe line was built from the Hidden Water Dome into Marmarth, North Dakota, where gas has been distributed since October, 1927.

The program of development for 1928 consists of a pipe line running south out of the field into the principal towns in the Black Hills of South Dakota. This

A MONTANA OIL REFINERY

line will be a 12" line and the towns to be served are Rapid City, Belle Fourche, Sturgis, Spearfish, Lead, Deadwood, Whitewood, Piedmont, Blackhawk, and Tilford. This work is now under way under the supervision of the Hope Engineering and Supply Company, and the main line is being laid at the present time at the rate of about two miles per day. Gas will be delivered in Belle Fourche by about August 1st, and the entire project to serve all of the Hills towns will be completed by December 1st. This development represents about 175 miles of main line and about 250 miles of distribution lines and an investment of about three million dollars.

Upon completion of this year's project, gas will be distributed to a population of approximately 50,000 people. All of the distribution of natural gas from this field with the exception of the gas used at Baker, Montana, is distributed by the Minnesota Northern Power Company and its subsidiaries, the Montana-Dakota Power Company and the Black Hills Utilities Company.

The Montana-Dakota Power Company has made application to the State Utility Commission of North Dakota for a permit to build a gas line east from the field through the towns along the route of the Northern Pacific to Fargo, and, in anticipation of the construction of this line, the Company has purchased the artificial gas plants at Mandan, Bismarck, and Valley City. It is expected that construction on the line east from the field will start during 1929.

The gas from the Glendive-Baker structure tests approximately 1,000 B.T.U. per cubic foot and is a dry gas. The rates charged for the gas in the various towns range from 85c top to 20c, and the consumers are finding that the use of natural gas is a great convenience and in most instances is cheaper than the use of coal.

The developments that the Minnesota Northern Power Company and its subsidiaries have made in the vicinity of the gas field represent an investment of approximately six million dollars to date, and the developments in the next few years will probably double that amount.

Havre is the second city in the state to use natural gas. The gas comes from the Eagle sandstone or from the base of the Montana formation. Recently Havre was connected by a pipe line to the Bowes structure in Blaine county.

Billings at present does not get its gas exactly from Montana, but it comes from Elk Basin, and as this structure is partially in Montana, it might be said that Billings gets its gas partially from Montana territory. The gas is piped 68 miles and, in addition to Billings, the towns of Bridger, Laurel, and others are also supplied. Billings might be able in the near future to secure her natural gas from the Big Lake district, as there are several producing gas wells already drilled in this structure.

Shelby and several other small towns in the northern part of the state use natural gas supplied from wells in the Kevin-Sunburst field. There are listed to-date 105 producing gas wells in this field.

Great Falls is using gas piped from the Sunburst structure, which is in township 32 north, range 1 west.

In a recent report by G. G. Howard, chief geologist for Sunburst Oil and Refining Company, he states that the gas pool in the southern part of the Sweetgrass Arch (Sunburst field) covers approximately 55 square miles with an average depth of 1350 feet to the gas sand. In addition to this field, there are several others of great value in the production of natural gas. Mr. Howard sums up his report in the following paragraph:

Recapitulation.

"Wells drilled in the Sunburst Field are capable of producing some 94,500,000 cubic feet of gas per day, insuring an ample amount for all forms of consumption in such a city as Great Falls with an estimated peak of 15,000,000 feet. The Sunburst Field alone contains enough gas to give a 20-year supply to Great Falls, amply justifying the expense of a gas line to that city. Outside of the Sunburst Field there are available gas fields sufficient, with the Sunburst Field, to supply gas at the rate of 15,000,000, 100% recovery, per diem for several generations. These fields are so located that they can be economically exploited by one trunk line, either direct to the Sunburst Field from Great Falls, with feeders from other fields, or going straight north from Great Falls through Galata, which is directly north of Great Falls, or through Chester, with a feeder line from the Sunburst Field, and the Grandview Structure. There are several small folds within the territory embracing from four to five square miles of reservoir capacity, which

have not been considered in this report but are available for gas production and are easily tapped from the main trunk line.

TABLE OF CAPACITIES.

Sunburst Field	200,000,000,000
Grandview Fold	365,000,000,000
Bingham or Reserve Fold	124,000,000,000
Flat Coulee Dome	100,000,000,000
Pinhorn Dome	294,000,000,000
Bears Den Structure	52,000,000,000
Government Creek Structure	74,000,000,000
Strode Structure	52,000,000,000
Utopia Dome	74,000,000,000
Total Cubic Feet	1,325,000,000,000

Many other structures in Montana such as Big Lake and others give much promise in the way of natural gas for Montana. Great Falls is now using natural gas. Then comes Helena, then Butte, and Anaconda, and finally Missoula. In less than a decade Montana's big cities will all be using Montana's Natural Gas.

Gasoline.

	Gallons Mfgd. in Montana	Gallons Sold in Montana	Gallons Sold outside Montana
1921	308,490	308,490	None
1922	3,728,288	2,728,288	None
1923	11,672,234	11,052,139	620,095
1924	26,022,212	21,048,299	4,973,913
1925	31,950,588	27,356,362	4,594,226
1926	37,212,681	33,162,804	4,049,877
1927	35,834,018	32,963,291	2,870,727
Total	146,728,511	129,619,673	17,108,838

	Gallons Consumed	Gallons Montana-made	Gallons Foreign	Percentage Montana-made used
1921	17,316,809	308,490	17,008,319	1.78
1922	24,601,456	3,728,288	20,873,168	15.15
1923	32,156,613	11,052,139	21,104,474	34.26
1924	34,385,261	21,048,299	13,336,962	61.19
1925	39,579,206	27,356,362	12,222,844	69.11
1926	48,604,801	33,162,804	15,441,997	76.56
1927	53,728,084	32,963,291	20,764,793	61.35
	150,372,230	129,619,673	120,752,557	

Table prepared by State Board of Equalization.

IN A MONTANA OIL FIELD

Developed and Potential Water Power in the United States.

(From Report of U. S. Department of Interior—Geological Survey.)

Developed Water Power Resources.

States	No. of Plants	Capacity in H. P. March 1, 1925
United States	...	10,037,655
1. New York	528	1,713,551
2. California	148	1,531,480
3. Washington	72	560,693
4. North Carolina	...	534,600
5. South Carolina	...	507,215
6. Maine	252	476,627
7. Wisconsin	156	412,715
8. Georgia	53	394,794
9. MONTANA	30	360,040
10. Massachusetts	347	344,439

POTENTIAL WATER POWER RESOURCES.

Available 90% of the Time.			Available 50% of the Time.		
States	Horsepower	Per Cent	States	Horsepower	Per Cent
United States...	34,818,000	100.00	United States...	55,030,000	100.00
1. Washington ..	4,970,000	14.27	1. Washington ...	7,871,000	14.30
2. California	4,603,000	13.22	2. Oregon	6,715,000	12.20
3. New York.....	4,010,000	11.52	3. California	6,674,000	12.13
4. Oregon	3,665,000	10.53	4. New York.....	4,960,000	9.03
5. Arizona	2,759,000	7.92	5. Idaho	4,032,000	7.33
6. MONTANA ...	2,550,000	7.32	6. MONTANA	3,700,000	6.72
7. Idaho	2,122,000	6.10	7. Arizona	2,887,000	5.25
8. Utah	1,420,000	4.08	8. Utah	1,586,000	2.88
9. Colorado	765,000	2.20	9. Colorado	1,570,000	2.85
10. Wyoming	704,000	2.02	10. Wyoming	1,182,000	2.15

PUBLIC UTILITY POWER COMPANIES AND CAPACITY OF GENERATORS JANUARY 1, 1928.

	1928		
	Operating Companies	Plants	Capacity of Generators (kilowatts)
MONTANA	13	32	218,738
Mountain States	139	274	975,419
United States	1,820	3,740	27,690,891

CONSUMPTION OF FUEL IN GENERATING ELECTRIC POWER BY PUBLIC UTILITY POWER PLANTS IN 1927.

	COAL		OIL		NATURAL GAS	
	Short Tons	Per Cent of U. S. Total	Barrels	Per Cent of U. S. Total	Thousands of Cubic Feet	Per Cent of U. S. Total
MONTANA	33,192	.08	2,160	.03	213,578	.34
Mountain States..	581,413	1 39	225,889	3.33	515,955	.82
United States.....	41,888,497	100.00	6,782,199	100.00	62,919,197	100.00

WATER POWER RESOURCES

Total of 360,000 Horsepower Developed—More Than Two Million Horsepower Still Available for Development.

The potential water power of the 48 states of the Union totals 34,818,000 horsepower. Of this amount, 2,550,000 horsepower is in the State of Montana—an amount exceeded only by the states of Washington, California, New York, Oregon and Arizona. Just 7.32% of the nation's water power resources are located within the borders of the Treasure State.

In Montana rise the two greatest rivers in the United States—the Missouri which originates on the eastern, and the Columbia, which flows from the western slope of the Rocky Mountains. During their flow through the State, the Missouri falls approximately 2,000 feet before it crosses the eastern boundary, and the Clark's Fork of the Columbia, from the headwaters of its tributary streams, falls 1,000 feet before crossing the State line on the west. These great rivers, fed by innumerable tributaries, offer practically limitless opportunities for the economical development of hydro-electric power.

History shows that such development has more than kept pace with the growth of population and the demands of a state that is as yet industrially young. From 1912 to 1925, the population of Montana increased approximately 50 per cent. During the same period water power development in the State increased from 98,000 to 360,000 horsepower, an increase of more than 250 per cent.

Fourteen Companies.

This total of 360 000 horsepower has been developed and is now being distributed by a dozen or so private companies, operating in the central and Western parts of the State. Although the Montana Power Company is the largest of these operators, it by no means constitutes a monopoly of the potential water powers of the State. Its total holdings, including 330,000 developed and 150,000 undeveloped, make a grand total of 480,000 horsepower. Deducting even this comparatively large figure from the State's total water power capacity of 2,550,000 horsepower, there still remains 2,070,000 horsepower available for others. In other words, there is 81 per cent of the State's potential water power not used, the majority of which is under federal control.

Early Developments.

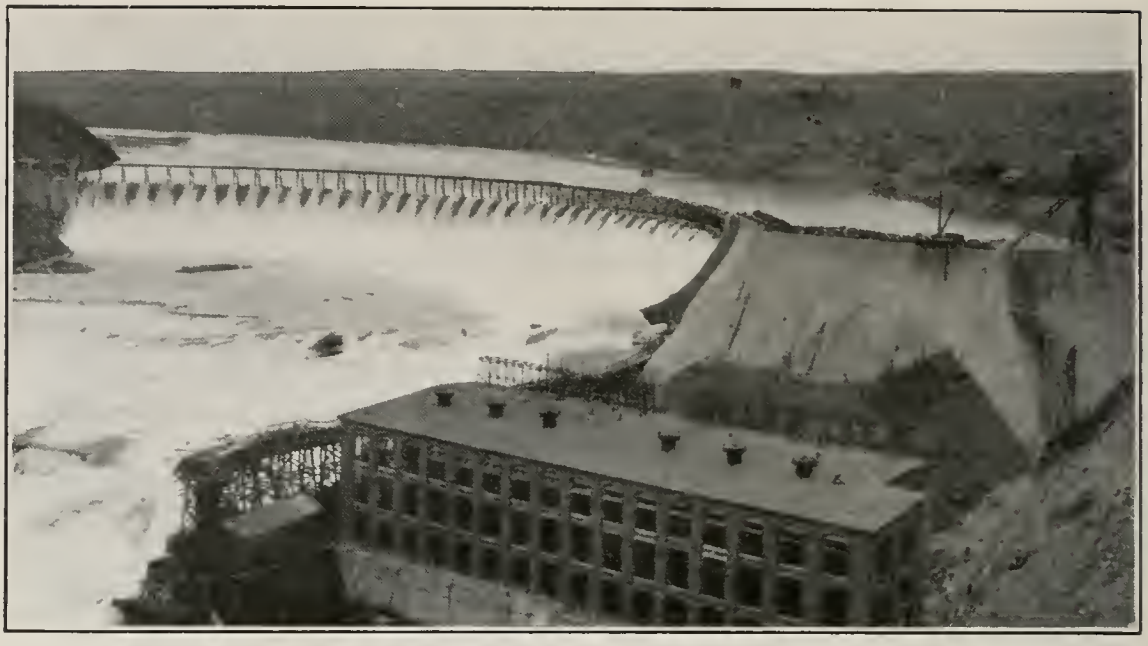
The first water power plant of importance in the State was built on the Black Eagle Falls on the Missouri River, near the city of Great Falls, in 1891. It had a capacity of 8,000 horsepower and supplied power to the Boston and Montana smelter, which was located on one side of the river near the Falls, and to the city of Great Falls, located on the other side of the river. To replace this pioneer plant, a million-dollar project, generating 25,000 horsepower, is now under construction.

In 1908, plants were built at Canyon Ferry on the Missouri River, 17 miles from Helena, and on the Big Hole River, 21 miles from Butte.

These three early plants, supplying power respectively to Great Falls, Helena, and Butte, and built at a time when the transmission of power by electricity was in its infancy, formed the nucleus of the Montana Power Company's system, which has now become one of the great power systems of the country.

In the following years, additional plants were built on the Missouri River at Hauser Lake, Holter, and at Great Falls, on the Madison River near Norris, on the Columbia at Thompson Falls, and on the Yellowstone River at Livingston and Billings, and last of all, on the West Rosebud Creek, at Mystic Lake. The combined capacity of all these plants now amounts to more than 300,000 horsepower.

These plants are all interconnected by a network of high voltage transmission lines, totaling over 2,400 miles in length.



Pioneering in Power.

When Lewis and Clark discovered the Great Falls of the Missouri in 1805, they described them in their immortal journal as "one of the grandest sights in nature." For 104 years they remained just that and nothing more.

For 25 years or, in other words, during the entire time that the Great Falls site was owned by James J. Hill and his associates, development of this great water power had been talked of and hoped for. Yet during all that time the Falls remained in the same state that Lewis and Clark had found them. Then came a Montanan, John D. Ryan, who, with his associates, organized the Montana Power Company. Development began at once.

Capital Supplied.

What were the capital requirements?

The promoters found themselves possessed of a site along the bank of a river whose maximum flow in flood season was 120,000 cubic feet a second and whose minimum flow was but 2,000 cubic feet a second. It was, therefore, obvious that the annual flow would have to be evened up and the minimum flow raised to at least 5,000 cubic feet a second, since the company could sell only the amount of power that could be produced at the lowest flow of the river. This meant the building of large and expensive dams and reservoirs to furnish head for the water wheels, hold back the floods and increase the stream in dry seasons. Besides dams and reservoirs, generating plants had to be built and equipped. To transmit the power generated at these plants to customers scattered over a territory 300 miles square—an area of one and one-half times that of New England—the Company has had to build 2 400 miles of high tension lines, together with 125 or more sub-stations and distributing systems. Other items of expenditure for physical properties have brought the company's total investment in the State to scores of millions.

Had to Find Money.

But these hydro-electric pioneers not only had to find the money with which adequately to develop this power, they had to create a market for it. Montana was and is still very largely a stock raising, lumbering and agricultural community, with little demand for power in appreciable quantities. There was, however, one peg upon which these promoters hung their hope of success. The great mining camp of Butte and the smelters of Anaconda and Great Falls were using large quantities of power generated by steam. Here was a potential market worth capturing. And when the Montana Power Company originally offered to replace 75,000 horsepower, generated by steam at a cost of $125 per horsepower, with

MYSTIC LAKE, STILLWATER COUNTY

75,000 horsepower of hydroelectric energy supplied at a cost of $35 to $50, the result was a foregone conclusion. Contracts were executed, installations were made, and from that day to this the mining companies of Montana have been making a saving in their power bills of millions of dollars a year.

This saving has very largely, in fact, almost entirely gone to the people of Montana. The mining companies have devoted that much more money to the development of their mineral resources and to the extraction and treatment of ores carrying proportionately less value. It works this way: Let us say, for instance, that today hydroelectric power saves the Anaconda Copper Mining Company $2,000,000 a year and that company produces and treats 4,000,000 tons of ore a year. Here is a saving of 50 cents a ton made in its operations. This saving enables the company to mine ore averaging six pounds less of copper per ton than it could otherwise have mined at a profit. And it increases enormously the tonnage of commercial ore which otherwise would have to be rejected and which, owing to mining conditions, would be lost forever. This feat of making commercially available millions of tons of ore that could not otherwise be extracted at a profit makes for the permanency of Butte, the prosperity of its people, and the safety and assurance of every business enterprise in the State directly or indirectly dependent on the mining and reduction of ores.

To Transportation.

Later on came the application of hydroelectric power to transportation. The Butte, Anaconda & Pacific was the first road in America to substitute electricity for steam locomotives in handling heavy railway traffic. So pronounced was its success that the Chicago, Milwaukee, St. Paul and Pacific followed its example, with the result that today Montana, with its 530 miles of trunk line installation, leads the nation in electrified steam railroads.

Gradually other infant industries were born and grew to robust stature very

largely because of the availability of cheap hydroelectric power. Street railways, cement and flour mills, creameries and ice-making plants, and hundred of smaller establishments requiring electrical energy and located in 90 cities and towns of the State are now served by this company.

Hydroelectric power has made industrial Montana a little world of its own, which employs more than 20,000 factory hands, who annually contribute to the raw materials handled an added value of $60,000,000.

Conserving Resources.

So much for the direct, definite benefits of hydroelectric development to industry. What of its effect in helping to conserve two of the other great resources of the state—coal and oil?

The present annual output of hydroelectric energy in the United States represents the equivalent of 40,000,000 tons of coal, or one-tenth of the 400,000,000 tons which the nation burns up every year in producing steam and electric power. The water power resources of this country so far developed are roughly 20 per cent of the total amount available. So that it is evident that there is enough undeveloped water power in the United States today which, if developed, would take the place of every ton of coal now consumed purely for power purposes.

To bring this condition nearer home, the Montana Power Company's yearly output of hydroelectric energy is the equivalent of more than 2,000,000 tons of coal a year, or 5,500 tons every 24 hours. This is more than 60 per cent of all the coal mined in Montana each year.

Also, while coal and petroleum are both actually destroyed when being transformed into power, water power is never destructively consumed. It constantly reappears in all its original vigor, and this saving, once accomplished, is perpetual. For example, the Montana Power Company takes a drop of water away up on the Madison, turns it into power, passes it on to other plants lower down which, in turn, repeat the performance until, by the time it escapes from the tail race at the Great Falls of the Missouri, it has been converted into commercial power no less than eight times at as many different plants and is still ready to do its full share in helping to bear the great flotillas of commerce along the Missouri and the Mississippi, from St. Louis to the gulf.

Cheaper Than Steam.

As for the economy and cheapness of hydroelectric service in comparison with coal or oil, no more startling proof can be afforded than the spectacle of every coal mine in Montana conducting its operations solely by electric energy purchased from the Montana Power Company at regular, published rates because this is actually cheaper than to use steam generated by coal from its own mine.

The development of water power in Montana means the saving of seven tons of coal per year for every horsepower produced. It means the distribution of power to places where the use of coal would be very costly. It means the supplying of power where coal could not be used. The development of every water power site is exactly equal to the discovery of a new coal supply of the same potentiality, without the necessity of operating a mine to take it out, or the building of a railroad to carry it to market.

In place of the mine and the railroad, water power development means the construction of dams and reservoirs and penstocks which direct its energy against machines which in turn actuate electric generators, whose product may be sent over wires through the countryside to the cities and villages, to turn their machines, light their streets, operate their car lines, supply their doctors and dentists with power for the X-ray and other instruments, to run the housewife's washing and sewing machines, flat irons, dishwashers and refrigerators, to operate the elevators of office buildings and apartment houses, to run the coffee mills and meat slicers in the stores, to make marcel waves in milady's hair, to put soles and heels on shoes and turn cream and milk into butter and cheese—in other words, to do the thousand and one things which were formerly left undone or were produced only at the expense of hard, manual toil.

Utilization of Power.

The largest single power consuming industry in the State is metal mining and reduction. The plants of the Anaconda Copper Mining Company and other mining and smelting companies in Butte, Anaconda, East Helena, and Great Falls consume over 150,000 horsepower.

The next largest class of power users are the electrified railways, which take some 50,000 horsepower.

In addition to these, large amounts of power are used for mining coal at the mines at Red Lodge, Bear Creek, Roundup, Sand Coulee, and Stockett.

An interesting development along this line is the recently developed open pit strip mine of the Northern Pacific Railway Company at Colstrip, Montana, 100 miles east of Billings. At this point there is a single vein of coal 28 feet thick, which lies about 20 or 30 feet below the surface. This coal is being mined with enormous electric shovels, and is used by the Northern Pacific Railway for the operation of several hundred miles of its main line.

A survey of this coal bed indicates that there are 150,000,000 tons of coal, having less than 100 feet over-burden, which can be obtained by stripping, and 90,000,000 tons at greater depth which can be obtained by mining. Electric power is used exclusively for carrying on this mining operation, it having been found far more economical than the use of steam power.

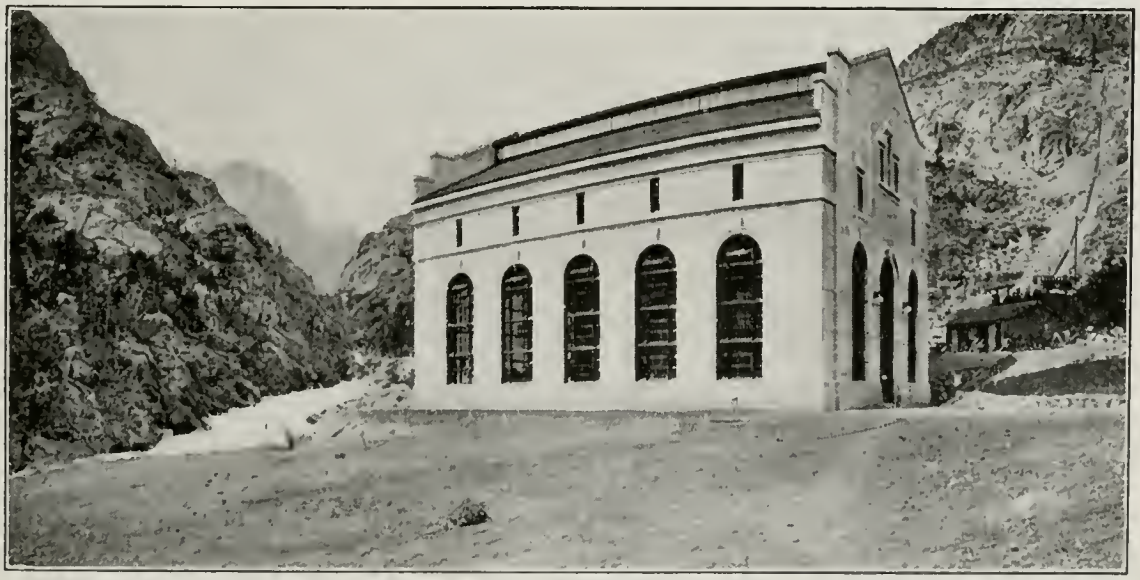
Power is used in considerable quantities for pumping water, both for irrigation and for city water supply. The city water supply for Butte is largely provided by pumping from the Big Hole River with electric power, and the cities of Billings, Livingston, Great Falls, and several smaller towns are entirely dependent upon electric power for their water supply. About 4,000 horsepower is used in the Prickly Pear Valley for irrigation, and large amounts are used in the vicinity of Billings and Great Falls for the same purpose. Electric power is used throughout the State for the operation of grain elevators, flour mills, and a considerable amount is taken by the sugar factories at Billings and at Chinook.

Vast Reservoirs.

It is of interest to note the relation of water power development to irrigation. Some years ago the waters of the upper Madison were impounded by means of a dam erected at great expense by private capital. Obviously this construction was authorized because the company wished to make available during the possible seasons of drought a vast reservoir of water which could be drawn upon to operate its plants on the Madison and the Missouri. Such a need came in 1919, when extremely low water made it necessary not only to tap this reservoir but to drain it practically dry in order to keep the plants running and the industries of the State in operation.

Incidentally, however, this reservoir supply, created through the foresight of private capital, turned out to be a Godsend to hundreds of farmers along the stream who were enabled to divert these impounded waters to the ditches of their irrigated farms, which otherwise would have had nothing to report but total crop failures. Thus in a very practical way an identity of interest was demonstrated between hydroelectric power development and irrigated farming.

Another feature of interest to the farmer is the use of hydroelectric energy to lift the water onto the land where irrigation by gravity ditches is impossible



MYSTIC LAKE PLANT OF MONTANA POWER COMPANY

or impracticable. During the last ten years Montana has developed a system of irrigation by electrically driven pumps, of which there are now more than 250 in use in this State. These projects use varying amounts. ranging from 5 to 3,600 horsepower. All told, they are capable of irrigating 37,000 acres of land.

Of the several irrigating pumping districts, the oldest and best known is the Prickly Pear irrigation project, near Helena, where farmers purchase water pumped to their lands at a low contract price. At Plains, Montana, is another project comprising 2,700 acres to which water is pumped electrically from wells.

Can Be Irrigated.

Montana has more than 2,250,000 acres of land susceptible to irrigation by pumping. If the experience of California, Utah, and other western states is to be repeated here, where we have an abundance of electric power available at a low price, irrigation by electrically operated pumping plants will undoubtedly outstrip the development of irrigation by gravity ditches in the very near future. And here again will be demonstrated a further community of interest between the agricultural and the hydroelectric enterprises of the State.

Electricity is rapidly being extended to the homes of farmers, whose wives are finding their household work much easier and the home more attractive to the young folks.

Domestic Uses of Electric Power.

At the present time, the Montana Power Company has 49,500 lighting and power customers, and 6,200 electric range users. The average consumption of electric energy in a home amounts to 39 kilowatt hours per month, which at present rates cost $2.16.

Fifteen years ago the average domestic consumer used 14 kilowatt hours per month and had practically the same monthly bill. Fifteen years ago the average customer had 10 or 12 16-candle power lamps and very little else in the way of electrical equipment. Today the modern home is equipped with lamps running from 25 to 200 candle power which, due to improvements in the lamps themselves, take no more power than the old 16-candle power lamps.

In addition, we have the electric range, the electric water heater, washing machine, ironer, vacuum cleaner, coffee percolator, toaster, curling iron, waffle iron, egg beater, radiant heater, and last, but not least, the electric refrigerator.

Undeveloped Horsepower Practical for Economic Development.

The following table shows the undeveloped horsepower in various Montana Counties that is at present practicable for economic development.

County	Developed Horsepower	Undeveloped Horsepower
Big Horn	0	100,000
Cascade	131,000	93,000
Custer	0	5,000
Flathead	4,000	24,000
Lake (Project now under way)	200	250,000
Lewis and Clark	101,000	20,000
Lincoln	0	20,000
Madison	12,000	20,000
Mineral	0	20,000
Missoula	3,000	0
Park	2,000	5,000
Sanders	47,000	198,000
Stillwater	15,000	15,000

PRODUCTION OF ELECTRIC POWER BY PUBLIC UTILITY POWER PLANTS IN 1927.

	TOTAL POWER		WATER POWER			FUEL POWER		
	Kilowatt Hours (000 omitted)	Per Cent of U. S. Total	Kilowatt Hours (000 omitted)	Per Cent of Total Power	Per Cent of U. S. W.P.	Kilowatt Hours (000 omitted)	Per Cent of Total W.P.	Per Cent of U. S. Fuel Power
MONTANA ...	1,394,655	1.74	1,381,096	99.0	4.62	13,559	1.0	0.03
MountainStates	3,520,047	4.39	3,033,688	86.2	10.16	486,359	13.8	.97
United States..	80,205,474	100.00	29,875,008	37.2	100.00	50,330,466	62.8	100.00

FROM MINE TO CONSUMER

A Trip Through Smelter, Electrolytic Plant and Copper Rod and Wire Mill of the Anaconda Company.

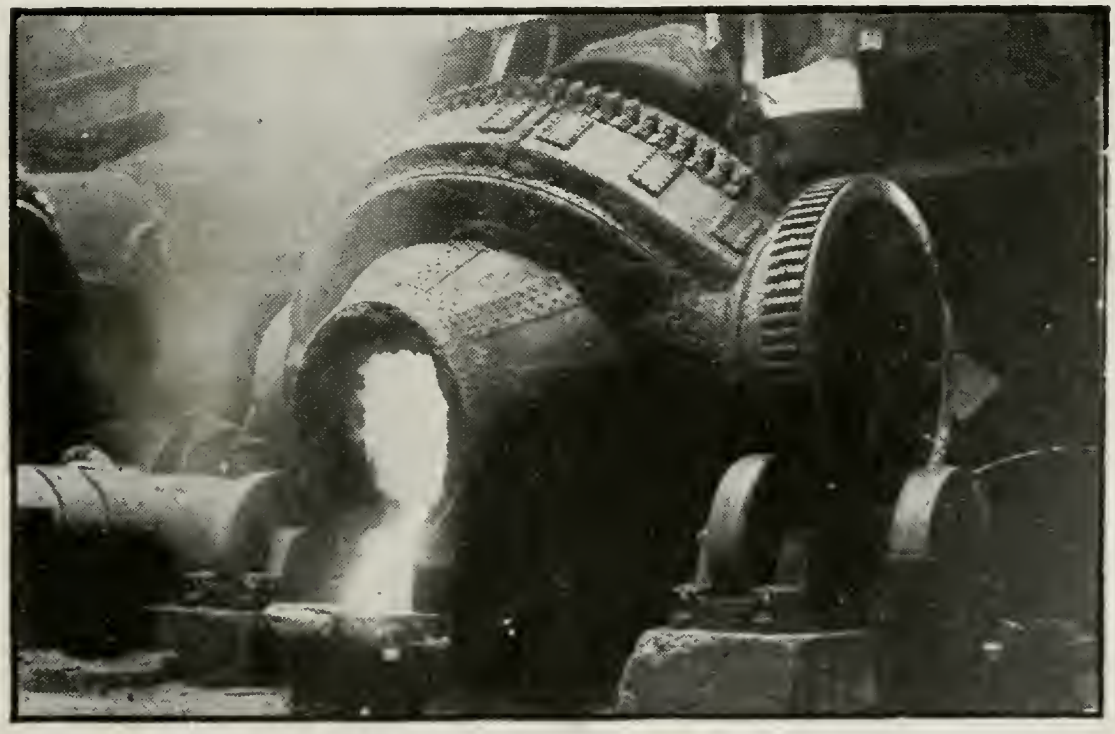
In Anaconda is located the largest non-ferrous smelter in the world. Its huge smoke stack, 585 feet high, is the largest in the world. The Washington monument, if dropped inside, would disappear. Its yearly capacity in metallic copper, zinc, lead, silver and gold would fill 4,569 33-foot railroad cars, making a train 28½ miles long. Yet 33 times that amount of ore has to be mined and treated to produce this amount of metal.

Over the Butte, Anaconda & Pacific Railroad—the first electrified steam road in the country—there pass from Butte to Anaconda 350 cars of ore a day. These huge bottom-dump steel cars are brimming with a gray-white substance that the geologists will probably tell you is chalcocite, since that is Butte's commonest mineral. To a tenderfoot it looks like nothing more valuable than railroad ballast. Yet from this apparently worthless rock human skill and ingenuity have devised a way to produce commercial copper, silver and gold.

As a matter of fact, we have the word of the mineralogist that this unpromising mass contains 52% silica, 10% alumina, 12% sulphur, 10% iron, with smaller proportions of lime, zinc, lead, arsenic, potash, tellurium and selenium. Most of these are of little or no commercial value and they all help to "gum up the works" when it comes to the job of reduction. Of the entire mass, only 3% is copper, with traces of silver and gold.

Built at an expense of millions of dollars, the Anaconda smelter is kept everlastingly at the job of rapping Mother Nature on the knuckles and loosening her clutch on the family treasure. To do this, the highly-paid men of science use fire and water, oil and acid.

After crushing, the ore is cleverly flooded and agitated until the light and valueless portions float away to the dump as "tailings." The residue, or concentrate, containing 8% copper, is roasted, removing 80% of the sulphur, which later appears as an important by-product in the form of sulphuric acid.



POURING SLAG FROM CONVERTOR AT ANACONDA SMELTER

After roasting we have "calcine," which goes to reverberatory furnaces for melting. The product is a matte, containing 40% copper, and slag, a waste product which is sluiced to the dump. The converters, another form of furnace, change matte into blister copper, which, in turn, after treatment in the refining furnace, is shaped into anodes containing 99.3% copper, with about 70 ounces of silver and four-tenths of an ounce of gold to the ton.

The processes just described take care of the bulk of the metal content. In the tailings that go to the dump, there still remain appreciable quantities of copper, silver and gold, and after some years have elapsed, permitting the oxidation of these tailings, they are subjected to a leaching process. Weak sulphuric acid removes the copper metal from the tai ings, carries it in solution and gradually precipitates it in a mud form, or "copper cement" upon a picturesque assortment of old iron junk, reposing in open air tanks.

In connection with the oil flotation process, a miner's wife is said to have discovered while washing her husband's overalls that small grains of metal invariably rose to the top of the soap bubbles in the family washtub. Whether or not this is so, a process utilizing the same principle is now in operation at all sulphide copper plants for extracting metal from the finer portions of crushed ore.

By the leaching and oil flotation processes approximately 18% of the metal values, formerly sluiced to the dump as waste, are now recovered.

From "Anode" to "Ingot."

One hundred and ninety-six miles northeast of Anaconda is located the Great Falls Reduction Department of the Anaconda Copper Mining Company, where are located an electrolytic copper refinery, an electrolytic zinc plant, and a rod and wire mill.

The last process performed at the Anaconda plant is the casting of the so-called "blister" copper in the shape of "anodes." These great slabs, about a yard long, two-thirds as wide, nearly two inches thick, and weighing nearly 600 pounds are cast so that two of the corners are provided with ears, or lugs, the purpose of which is p'ain when one enters the vast, barracks-like tank room at Great Falls.

Suspended by the ears in huge wooden tanks—of which there are more than a thousand, all containing weak sulphuric acid—are more than 25,000 of these anodes. Personally escorting each, as "companions of the bath," are a like number of "cathodes,"—thin sheets of pure copper. Through the acid a current of electricity is constantly passing, of which an anode is the positive, and a cathode the negative terminal. To the astonishment of the bystander he learns that the

COMPRESSED AIR LOCOMOTIVE AND TRAIN AT SMELTER

LEACHING TANKS AT ANACONDA REDUCTION WORKS

combination of "juices," electrical and chemical, actually dissolves the anode and deposits upon the cathode a coating of pure copper.

The job is unhurried. It takes 24 days for an anode to do what a lump of sugar does instantly in your morning cup of coffee. Every six days, however, the cathodes, having imbibed about as much copper as they can stand,—about 130 pounds—are withdrawn and fresh recruits drafted for service. During this process the impurities, including the gold and silver residues, sink to the bottom and are afterwards drawn off, dried and shipped to eastern refineries for final recovery.

The finished anode is practically pure copper. But as it resembles nothing so much as a huge sheet of peanut brittle, it is in no shape to be shipped to a rolling mill. So it goes to the furnace refinery to be remelted, endowed with oxide and cast into forms suitable for the use of the fabricators. These shapes consist of wire bars, slabs, cakes, billets, and ingots, each adapted to the particular use for which it is intended—rods, sheets, tubes or castings.

A copper refinery has two jobs. One is to produce the high grade copper upon which the electrical and other industries are so dependent. The other is to recover from the blister copper its precious metal content. About 80% of all the silver, and 15% of all the gold in the world come to us as by-products of the copper, lead, nickel, and cobalt refineries.

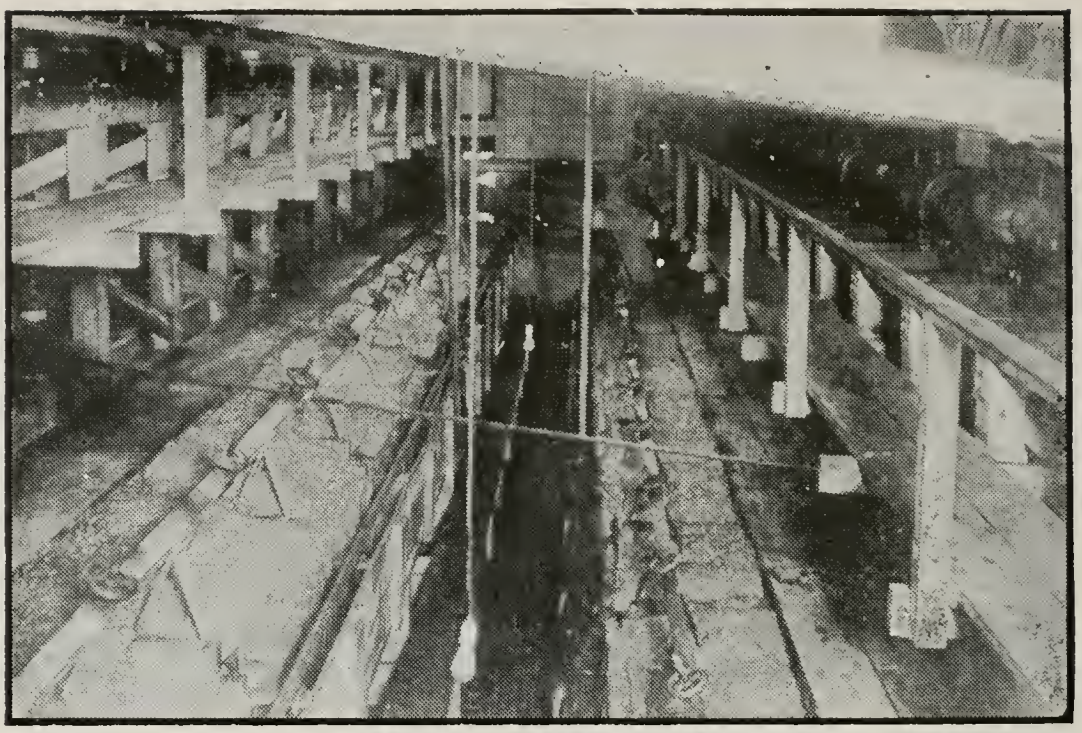
The impurities which sink to the bottom of the electrolyte tanks are known as "slimes" or "anode mud." In addition to some copper which has failed to attach itself to the cathodes, these slimes contain considerable silver and small percentages of tellurium, lead, arsenic, antimony, selenium, nickel, bismuth, gold, and iron, their proportions to the entire mass being in the order named.

Electrolytic Zinc.

In 1916, after years of experimentation, metallurgists of the Anaconda Company perfected an electrolytic process for zinc reduction. Today eight of the company's mines at Butte are delivering zinc ores to the Anaconda concentrator, whence they are shipped to the zinc plants at Great Falls and Anaconda as "concentrates"—ores from which much of the waste material has been removed by crushing, agitating and flooding.

Here the concentrates are fed to a roasting furnace which converts zinc and lead sulphides into sulphate, expels excess sulphur and oxidizes iron and other metal content.

They next go through the leaching solution—return acid from the electrolytic



Minerals Separation or Flotation Machines at Anaconda Reduction Works

tanks—which purifies the zinc content and rids it of undesirable alloys, at the same time changing it from a solid to a liquid and carrying it in solution to the tank room, which, to the casual observer, looks like a twin sister of the copper tank room. But there is a marked difference in the goings-on in these two electro-chemical bath tubs. In the copper refinery, the job of the electrical and chemical juices is merely to transfer the copper of the anode to the surface of the cathode. In the zinc plant—where, by the way, ten times as much electrical energy is required—the task is to change the zinc solution to a solid and precipitate it upon aluminum sheets, suspended in the bath much as were the cathodes in the copper refinery.

At regular intervals men strip these aluminum sheets of their zinc accretion, take it to the casting plant and melt and pour it into slabs weighing around 50 pounds each.

By this process, after years of effort and the expenditure of $7,000,000 in experimental and construction work before a penny of profit was realized, was evolved electrolytic zinc, 99.9% pure.

Great Falls Rod and Wire Mill.

Up to 1928 an evergrowing amount of metallic copper had gone to the Atlantic Seaboard to be made into sheets, rods and tubes and particularly copper wire, only to begin a return journey across the continent for use in the land of its nativity and along the Pacific Coast. But eight years ago the rod and wire mill at Great Falls changed all this by affording the far west a convenient supply base for copper rods and wire and giving the Anaconda Copper Mining Company clear title to the slogan: "From Mine to Consumer."

In the making of copper rods and wire, the Great Falls plant takes from the near-by refinery the 200-pound wire bars and places them on a table at one end of a bar-heating furnace. Here a pusher, operated by compressed air, moves them along into the furnace, which holds 100 bars, lying side by side. Fuel oil furnishes the heat and it takes one hour for a bar to be properly heated.

At the rate of 100 an hour, strong-armed workmen remove these white-hot bars with a pair of tongs suspended from a trolley which runs in line with the first groove in the "roughing" mill. This mill consists of a series of motor-driven rolls, one above the other. As the bar emerges from the first groove it drops and enters the second, passing through this to the side of the machine from which it started. This process is repeated in succeeding rolls until it has been drawn and squeezed seven times.

By this time it has become a long, fiery, red serpent, hissing and sizzling all

over the place. Accomplished snake charmers now catch it and pass it back and forth through other pairs of rolls until the obstreperous ophidian is thoroughly "taken down" and reduced to its proper finish and size.

During these operations our copper rod has undergone every stage of heat from white to red, but by now it is almost cold and black with oxide, stolen from the air. Its next pilgrimage is through an iron pipe into a machine which winds it into a coil. After successive baths in sulphuric acid and water the black disappears and it presents the complexion of a sunburned swimmer. From these rods, ranging in size from one-fourth to five-eighths of an inch in diameter, wire is made.

For the larger size wires, a rod is drawn through one cast-iron die at a time until finished. For the smaller sizes it is placed on a continuous wire-drawing machine and drawn through a series of dies, all at one operation. It is then drawn into a coil on a revolving block or else wound on a reel. Usually a die will draw about five miles of wire before the hole gets too large and has to be reamed out and returned to service in making larger size wire.

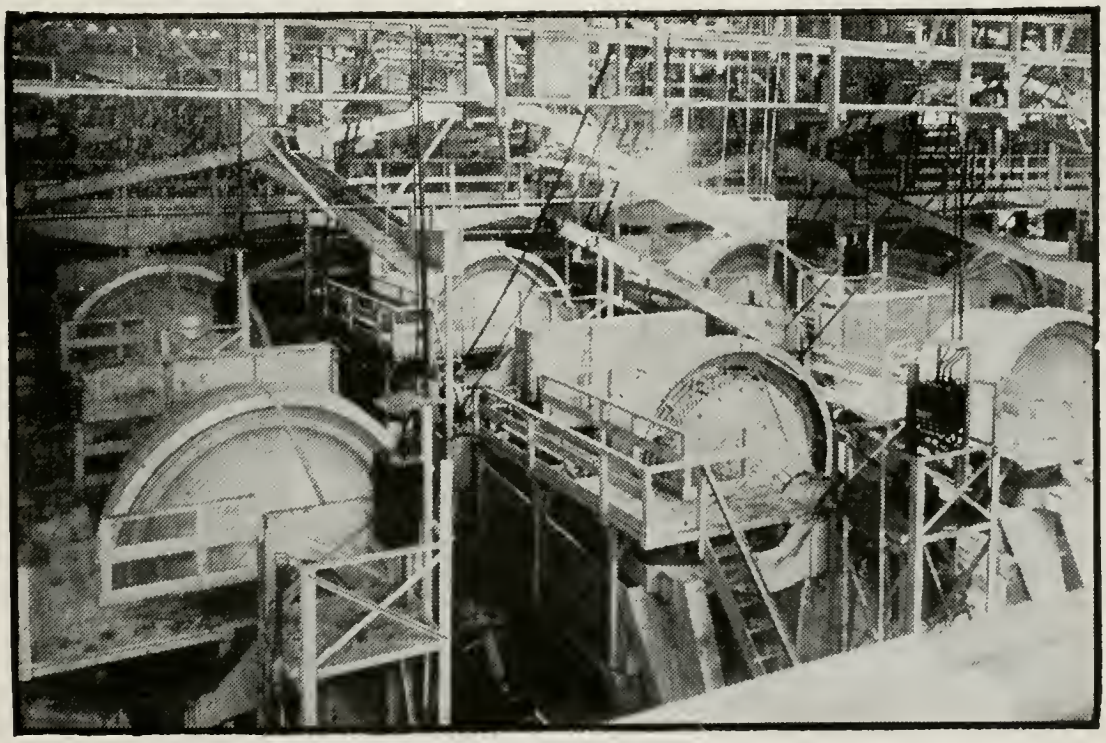
Wire-drawing hardens copper. If this is the product desired, it is now ready for shipment. But if soft-drawn wire is wanted it is passed through an annealing furnace—which means that it is merely reheated enough to make the wire soft and pliable.

The plant also has a complete stranding equipment with which it manufactures copper cables, varying in size from a simple two-strand combination up to the huge cables used in high-power transmission and containing hundreds of separate wires.

Superphosphate Fertilizer.

Within the past five years the Anaconda Copper Mining Company has developed at its plant at Anaconda the production of "Anaconda treble superphosphate," the capacity of the plant having been enlarged until it can now handle 220 tons of raw material and make 128 tons of finished product per day. "Mineral Resources of the United States," a publication of the United States Geological Survey, in its issue for 1920 contains the following description of the process of manufacture:

"At the plant of the Anaconda Copper Mining Company large quantities of sulphuric acid are derived from smelter fumes. High freight rates and distance from market have made it practically impossible for the company to market this sulphuric acid, and the metallurgical department therefore conducted experiments for a considerable time at the old Bradley plant at Anaconda in the utilization of



HARDINGE MILLS AT A MONTANA CONCENTRATOR

this acid in the manufacture of fertilizers. The Anaconda Company owns phosphate deposits at Melrose and Garrison, Montana, and did some development work at both places. The manufacture of "Anaconda treble superphosphate" was begun in the summer of 1920 in a plant having a capacity of 50 tons of raw material a day. The process of making superphosphate is, briefly, as follows: Raw phosphate rock is crushed and ground in Hardinge mills to about 80-mesh; it is then treated in agitators (tanks) with 60% sulphuric acid, ton for ton. The solution goes to Dorr thickeners, thence to an evaporator; and the concentrated solution is mixed with finely pulverized raw phosphate rock in the proportion of 2:3. The finished product is said to contain about 48 per cent available plant food."

Recovering Zinc from Slag.

Late in 1927, operations began at the newly built slag-treating plant of the Anaconda Company, adjacent to the American Smelting and Refining smelter in East Helena.

This plant puts into practical operation the process devised by Messrs. Garred and Laist for the recovery of the zinc content remaining in the slag produced by silver-lead recovery by the American Smelting and Refining Company.

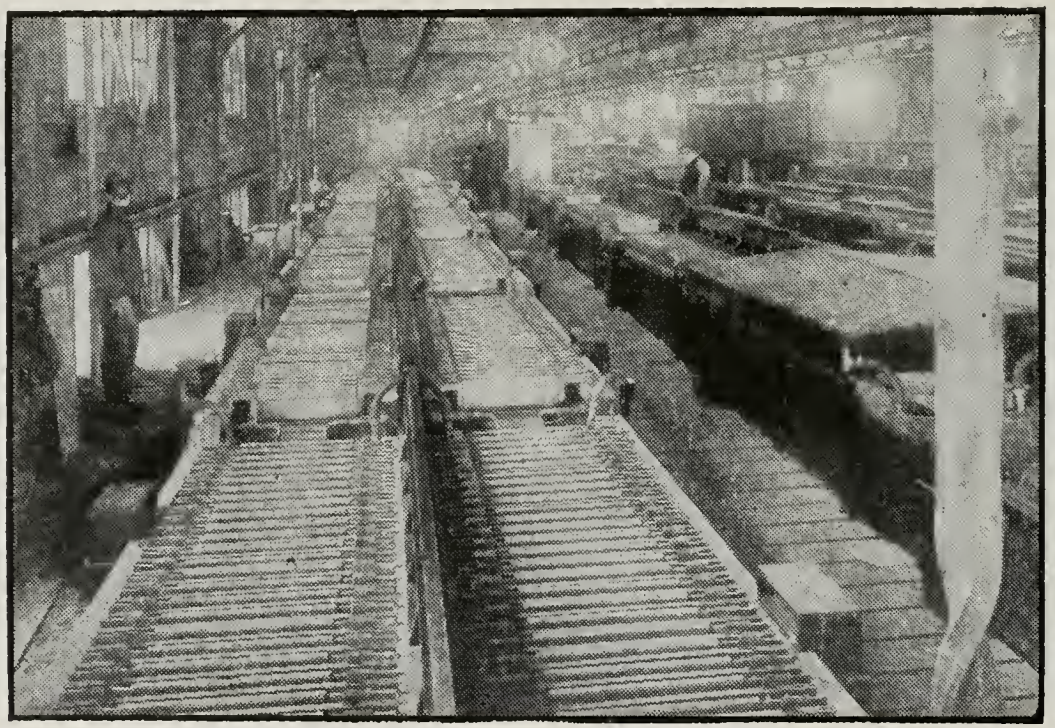
Briefly stated, the operation is this: The ore having been smelted at high temperature for silver-lead recovery, the hot slag remaining is immediately transferred to the Anaconda furnace, where it is heated to a temperature fully 500 degrees hotter.

Here metallic zinc is expelled in the form of vapor; then air is introduced, changing the product to zinc oxide, which passes through some 1,500 feet of variegated pipe installation for cooling before it reaches the bag-house, where it settles in immense hoppers, from which it is shipped for immediate use in the arts, or for further refining if necessary.

Approximately 200 tons of slag are treated every twenty-four hours.

Manganese Milling.

Significant among Montana's new industries is the milling plant of the Domestic Manganese and Development Company (Butte), completed during the last year at a cost of approximately half a million dollars. The plant is expected to make active many properties yielding manganese ores which have been dormant for that purpose, since the war. Some of the ores will come from the Butte district, but it is understood that there is a considerable tonnage in Granite county, near Philipsburg. The plant itself will not call for many workmen, the operation of roasters and feeders being almost automatic.



ELECTROLYTIC TANKS FOR ZINC

LEAD SMELTING

East Helena Plant Retains First Place as Largest Blast Furnace Lead Plant in United States.

Last year, 1927, 300,000 tons of ore and flux were smelted at the American Smelting & Refining Company plant at East Helena; lead production 78,865 tons. It is predicted that with the compiled figures of 1927 the smelter will, in point of lead production, be the largest blast furnace lead smelting plant in the United States.

Operations show that more than one million dollars in ore and payroll checks is being handled through the banks of Helena and East Helena every month. Two million dollars in freight charges on ore and bullion, paid to the railroads.

Four hundred men are employed in the plant, which operates on a 24-hour basis with three shifts. These men collectively receive more than $70,000 per month in salaries.

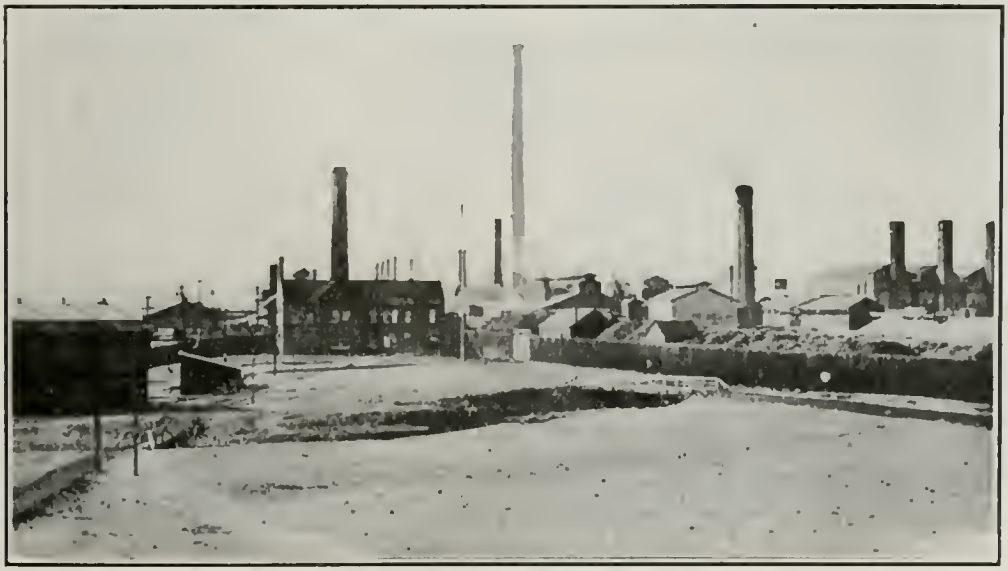
An up-to-date safety department is maintained and health is safeguarded through a company medical service, bath and change houses, sanitary equipment and a pure water system.

These are a few of the facts that go to show the successful advancement of the smelter during the past few years. Even now, with all the furnaces operating full time, the hills are being combed for more ore, old dumps are being scratched, old mining industries are being revived—all in the endeavor to build up the tonnage prospects and assure Montana of her birthright place in the mining world.

Montana supplies 56 per cent of the ore that went through the East Helena smelter last year. One-half of this production, however, came from the Great Falls zinc plant residues derived from ores originating in the Coeur d'Alenes, Montana and Utah; one-half of this 56 per cent was straight Montana ore coming from mines scattered throughout the state. All of the remaining 44 per cent came directly from the mines operating in the Coeur d'Alene district, Idaho.

In order to handle the increasing new business, $160,000 was expended in 1927 for new construction work. A new roaster has been installed and the blast furnaces enlarged, which increased the output of the smelter 10 per cent over former capacity.

The history of a lead smelter is one improvement after another, made necessary by the new methods requiring new treatment, and the East Helena plant is



THE LARGEST LEAD SMELTER IN THE WORLD, EAST HELENA, MONTANA

no exception to the rule. As a consequence, even though the plant itself was built many years ago, the machinery and methods employed have been revamped every ten years in order to bring the smelter up-to-date in all respects.

Particularly interesting to the layman, and extremely enlightening to the shipper is the sampling process used at the East Helena plant.

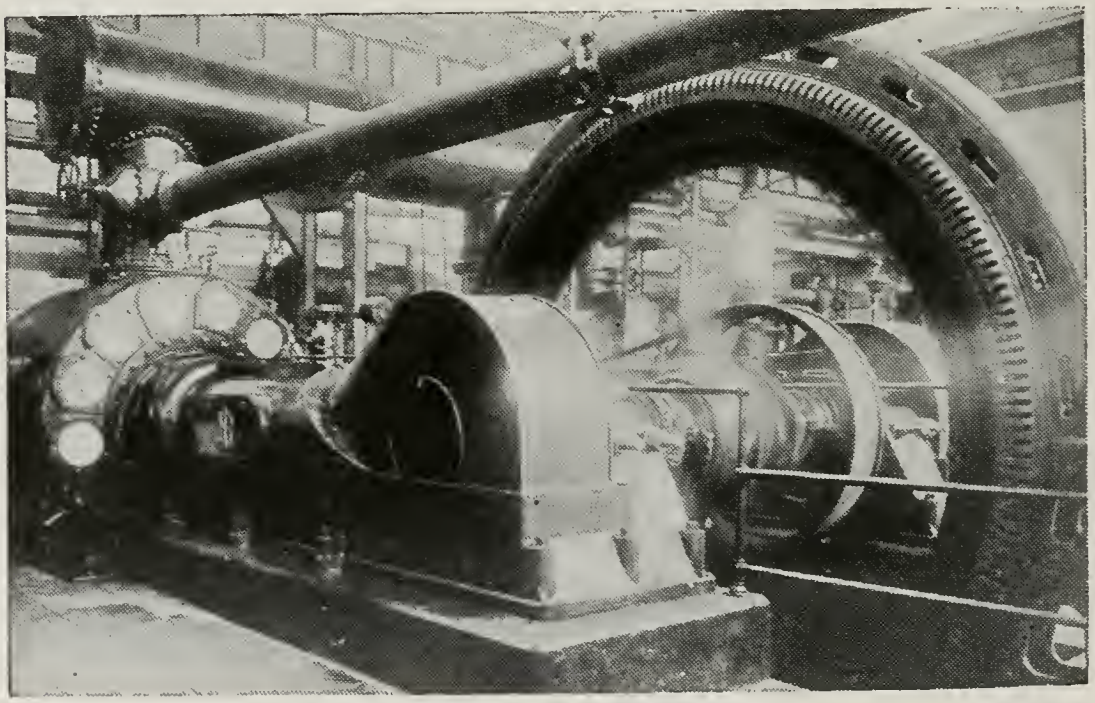
The ore upon arrival is weighed on Northern Pacific scales that are checked with frequency by the federal testing department; representatives from both the railroad and the smelter are present. These representatives are sworn weighmasters and are responsible for their reliability and honesty not only to the railroad and the shipper but to the Western Weighing Bureau Association.

On the basis of this weight, freight charges are collected by the railroad and the ore then sold to the smelter on the valuation of the car which is subsequently determined by sampling and assaying. A moisture sample is taken in the presence of the shipper or his representative to determine the dry weight of the ore—the dry weight being the basis of settlement with the shipper.

The ore is then switched to the sampling mill, passed through a crusher and an automatic sample cut from the stream of crushed ore. This automatic sampler is known as a Vezin sampler and cuts one-fifth from the entire shipment. This one-fifth reduced in size and further one-fifth portions cut out until the final sample is one-six hundred and twenty-fifth of the weight of the original shipment. At the same time a sample consisting of 2% of the weight of the shipment is automatically cut out to comply with the Montana state laws on ore sampling.

The mill sample is then further cut down in quantity and pulverized to pass through a 100 to 150 mesh screen. This resulting pulp is divided into three portions, one of which goes to the shipper, one retained by the smelter and one sealed and held for the umpire in case of disagreement on assays submitted by the shipper and smelter. This umpire-assayer selected is one mutually agreed upon by shipper and smelter. These pulp samples actually represent the metal contents of the shipment and are assayed by both parties for value.

On the basis, then, of the dry weight of the original car and the assayed value per ton as determined by the mill sample, the ore is purchased by the smelter.



NINETY POUND AIR COMPRESSOR WITH ELECTRIC DRIVE

THE STANDING OF THE LEADING COUNTIES OF MONTANA IN VALUE OF OUTPUT FOR 1927.

VALUE ALL INDUSTRIES

1.	Silver Bow	$53,204,843
2.	Cascade	17,142,452
3.	Yellowstone	15,960,440
4.	Fergus	11,574,072
5.	Lewis & Clark	10,980,060
6.	Deer Lodge	10,432,784
7.	Toole	8,603,909
8.	Gallatin	8,525,240
9.	Chouteau	8,033,982
10.	Carbon	7,806,635

PER CAPITA PRODUCTION

1.	Toole	$1,753.00
2.	Beaverhead	1,458.00
3.	Judith Basin	1,394.00
4.	Treasure	1,265 00
5.	Liberty, Meagher (Tie)	1,104.00
6.	Chouteau	1,093 00
7.	Wibaux	1,014.00
8.	Teton, Rosebud (Tie)	983.00
9.	Golden Valley	964.00
10.	Petroleum	951.00

VALUE CROPS PRODUCED

1.	Fergus	$7,183,870
2.	Yellowstone	7,157,440
3.	Sheridan	6,353,096
4.	Chouteau	6,265,982
5.	Hill	5,310,505
6.	Valley	4,980,901
7.	Gallatin	4,800,540
8.	Richland	4,749,750
9.	Daniels	4,601,935
10.	Cascade	4,575,390

LIVESTOCK AND CROPS

1.	Yellowstone	$10,191,440
2.	Fergus	10,135,970
3.	Chouteau	7,850,982
4.	Sheridan	7,132,296
5.	Cascade	7,006,190
6.	Valley	6,937,401
7.	Beaverhead	6,522,442
8.	Hill	6,360,005
9.	Gallatin	6,174,840
10.	Richland	6,034,050

VALUE LIVESTOCK SOLD

1.	Beaverhead	$3,429,500
2.	Yellowstone	3,034,000
3.	Fergus	2,952,100
4.	Cascade	2,430,800
5.	Blaine	1,976,100
6.	Valley	1,956,500
7.	Rosebud	1,748,900
8.	Phillips	1,694,100
9.	Custer	1,691,700
10.	Lewis & Clark	1,648,700

INDIVIDUAL CROPS

VALUE ALL WHEAT

1.	Chouteau	$5,270,500
2.	Fergus	4,883,040
3.	Hill	4,394,380
4.	Sheridan	4,284,930
5.	Teton	3,566,300

VALUE OATS

1.	Sheridan	$618,640
2.	Daniels	497,200
3.	Valley	446,600
4.	Phillips	422,400
5.	Fergus	400,400

VALUE CORN

1.	Richland	$388,800
2.	Rosebud	349,920
3.	Yellowstone	345,600
4.	Dawson	302,400
5.	Roosevelt	241,920

VALUE SPRING WHEAT

1.	Hill	$4,328,140
2.	Sheridan	4,257,330
3.	Chouteau	3,637,500
4.	Teton	3,505,580
5.	Daniels	3,225,250

VALUE SUGAR BEETS

1.	Yellowstone	$1,439,900
2.	Carbon	499,375
3.	Richland	233,750
4.	Big Horn	177,863
5.	Stillwater	154,700

VALUE FLAX

1.	Sheridan	$661,500
2.	Dawson	514,500
3.	Daniels	421,750
4.	McCone	404,600
5.	Valley	329,000

VALUE TAME HAY

1.	Fergus	$1,243,200
2.	Gallatin	1,029,000
3.	Cascade	1,023,120
4.	Carbon, Park (Tie)	869,400
5.	Ravalli	840,000
6.	Yellowstone	806,400
7.	Beaverhead	776,160
8.	Lewis & Clark	771.120
9.	Powell	683,720
10.	Madison	714,000

VALUE POTATOES

1.	Flathead	$291,200
2.	Ravalli	181,350
3.	Gallatin	136,500
4.	Lewis & Clark	136,110
5.	Yellowstone	133,770

VALUE RYE

1.	Blaine	$235,936
2.	Phillips	102,200
3.	Sheridan	101,616
4.	Roosevelt	98,550
5.	Chouteau	71,175

TOTAL VALUE FARM PRODUCTS 1927

Products of Farms	$149,031,000
Livestock Products	67,049,000
Fish, Game and Fur Products	2,500,000

MANUFACTURING, MINING, ETC.

VALUE METAL MINING AND QUARRIES

1.	Silver Bow	$45,790,000
2.	Cascade	650,000
3.	Granite	500,000
4.	Jefferson, Fergus (Tie)	400,000
5.	Gallatin	300,000
6.	Lewis & Clark	279,000
7.	Judith Basin	250,000
8.	Beaverhead	150,000
9.	Madison	125,000
10.	Lincoln	80,000

TOURIST TRAFFIC

1.	Missoula	$635,000
2.	Park	633,000
3.	Yellowstone	584,000
4.	Cascade	575,000
5.	Silver Bow	570,000

VALUE MANUFACTURING OUTPUT

1.	Deer Lodge	$9,450,000
2.	Cascade	8,395,000
3.	Lewis & Clark	7,000,000
4.	Silver Bow	6,091,000
5.	Yellowstone	5,185,000
6.	Missoula	5,000,000
7.	Lincoln	3,659,000
8.	Flathead	3,610,000
9.	Custer	1,937,000
10.	Gallatin	1,720,000

VALUE COAL MINING

1.	Musselshell	$2,855,133
2.	Carbon	2,139,521
3.	Rosebud	1,904,850
4.	Cascade	506,032
5.	Richland	67,881

VALUE PETROLEUM

1.	Toole	$5,869,299
2.	Petroleum	1,046,430
3.	Stillwater	50,662
4.	Carbon	22,873

TOTAL VALUE OF PRODUCTS OTHER THAN AGRICULTURE 1927

Metal Mines and Quarries	$50,000,000
Manufacturing	65,000,000
Lumber	4,650,000
Coal Mining	7,975,000
Petroleum and Natural Gas	7,242,000
Tourist Traffic, Auto and Rail	12,000,000

THE COUNTIES OF MONTANA

When the Territory of Montana was established in 1864, the whole vast area was divided into the nine counties of Beaverhead, Big Horn, Chouteau, Deer Lodge, Edgerton, Gallatin, Jefferson, Madison and Missoula.

The increase of population and the extension of settlement has made necessary the creation of additional counties until today they number 56.

In the county arrangement used in this book, grouping is made to include counties with similar farming conditions in the same group, the state being divided into nine such groups.

A small map included with the description of each of the nine districts, on the following pages shows which counties are included in each district.

To simplify finding particular counties, the following alphabetical listing shows the name of the county and page where data on that county may be found:

County	Page
B	
Beaverhead	250
Big Horn	234
Blaine	301
Broadwater	275
C	
Carbon	245
Carter	226
Cascade	269
Chouteau	306
Custer	229
D	
Daniels	295
Dawson	260
Deer Lodge	283
F	
Fallon	228
Fergus	276
Flathead	314
G	
Gallatin	243
Garfield	255
Glacier	300
Golden Valley	266
Granite	282
H	
Hill	308
J	
Jefferson	271
Judith Basin	268
L	
Lake	311
Lewis and Clark	272
Liberty	305
Lincoln	313
M	
Madison	248
McCone	259
Meagher	274
Mineral	279
Missoula	286
Musselshell	264
P	
Park	242
Petroleum	267
Phillips	291
Pondera	304
Powder River	233
Powell	280
Prairie	256
R	
Ravalli	284
Richland	258
Roosevelt	289
Rosebud	230
S	
Sanders	315
Sheridan	292
Silver Bow	251
Stillwater	240
Sweet Grass	237
T	
Teton	303
Toole	298
Treasure	232
V	
Valley	293
W	
Wheatland	265
Wibaux	254
Y	
Yellowstone	238

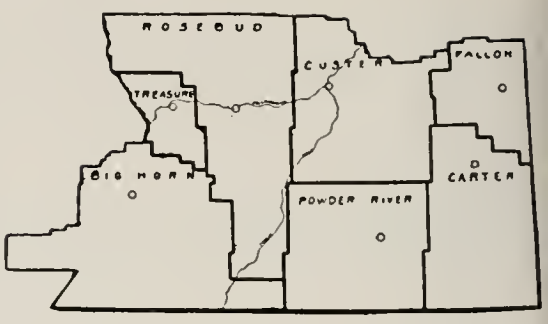
SOUTH EASTERN MONTANA

Stockraising and Non-Irrigated Farming the Chief Industries—One of the Leading Corn Districts, Large Coal Fields—New Rail Line Completed in Red Water Valley.

In the days of the trail herds one of the most noted stock districts of the northwest was the territory which now includes the counties of Carter, Fallon, Custer, Powder River, Rosebud, Treasure, and Big Horn. Today stock raising is still the leading industry. Feeder stock from this section of Montana is in demand by corn belt feeders and is said to be preferred over that from other sections of the west. Cattle in the district are on the increase. In 1924 there were 165,475 head and in 1928, 208,050 head, nearly a 26 per cent increase. Stock growers in the two counties of Rosebud and Custer in 1927 marketed $3,440,600 worth of stock, placing respectively seventh and ninth among counties of the state in value of livestock sold.

Sixteen and nine-tenths per cent of all land in farms in Montana is in this district and ten per cent of all crops are produced here. The district produces 59 per cent of the alfalfa seed, 21 per cent of the corn, 16 of wild hay, 16 of dry beans, 15 of alfalfa hay, 14 of sugar beets, 12 of winter wheat, 12 of barley, 12 of rye, 11 of oats, 11 of all tame hay, nine of flax, eight of potatoes, seven of all wheat, 6 of spring wheat and two per cent of the apples.

Except in the Yellowstone and Big Horn valleys, non-irrigated farming is the dominent method of agriculture. The one-crop system has prevailed but in recent years corn, to which the region is particularly adapted, has been introduced and the acreage devoted to it is rapidly expanding. Rosebud now stands second in the state in value of corn produced.



Wheat is the chief cash crop, conditions being most favorable to spring wheat varieties. Marquis is the leading spring wheat grown in the district at present. A high protein wheat is produced. Conditions for winter wheat are fairly good under the furrow drill method. Karmont is recommended as the best variety. Barley is the leading small grain feed crop, while sweet clover leads in hay crops. The Great Northern field bean has proved a valuable cash crop in some parts of the district.

The Montana State Extension Service, studying the needs of southeastern Montana make the following general recommendations:

1. The farming-grazing type of agriculture is the type best adapted to the region.
2. More stock should be introduced and more of the range lands utilized.
3. Stockmen will profit by devoting much of their attention to raising feeder stock to send to corn belt states for finishing off.
4. Potato acreage should be increased to produce at least enough for local consumption.

The largest coal measures in the state underlay this district. At Colstrip in Rosebud county the Northern Pacific railway company operates a strip mine on a vein of sub-bituminous coal 28 feet thick and underlying an area of 700 square miles within this state. The remaining portion of the vein runs over into Wyoming.

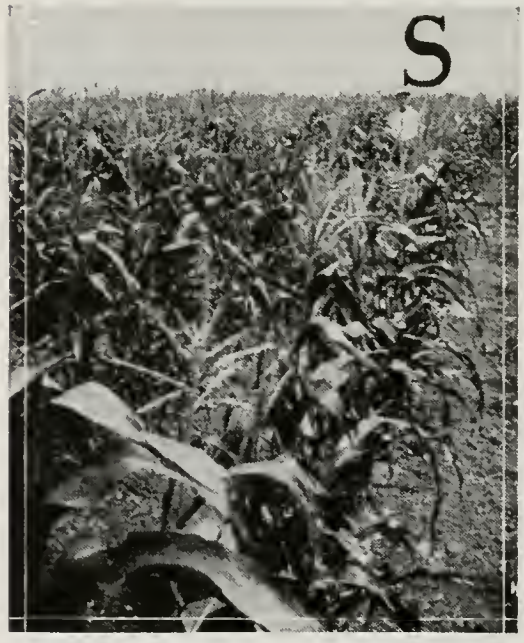
The district is the leading producer of natural gas. From the Cabin Creek field gas has been piped to Baker, Miles City, Terry and cities in North Dakota. Oil in commercial quantities has been found in the western part where there is also considerable undeveloped hydro-electric power and big deposits of Gypsum.

The growing season ranges from 120 to 145 days and the elevation from 2,300 to 3,000 feet.

CARTER COUNTY

Date of Creation	Feb. 22, 1917	Est. County Population Jan. 1, 1928	3,432
Land Area	3,319 sq. miles	Population 1920	3,972
County Seat	Ekalaka	Population County Seat	433
Altitude of County Seat	3,000 feet	Growing Season	120 to 140 Days

By J. F. Lewis



SITUATED in the extreme southeastern corner of Montana, Carter County is larger than some states, and most of the land is fertile and productive. The county with its wealth of natural resources is destined to become one of the best in the state. Crops of all kinds do well, and farmers have learned that success depends upon diversification.

Surface and Soil: With the exception of the territory occupied by the National Forest, most of the surface of the county is a rolling prairie and the larger portion of it is tillable. The soil varies from a sandy loam to a heavy gumbo. According to the last reports there were 849,771 acres of unreserved homestead lands in the county.

Crops: The principal crops are wheat, corn and other grains, hay and the various grasses, potatoes and garden products.

Drainage and Water Supply: The Little Missouri River meanders through the eastern part of the county, the other principal streams being the Box Elder and Beaver Creeks. They are fed by numerous tributaries.

Industries: Farming, stock raising and dairying are the principal industries, the latter being fostered by an up-to-date creamery in Ekalaka. In the number of sheep, the county stands fifth in the state. The cattle and hog industries are important, with the latter steadily gaining. The poultry business is also thriving.

Mineral Resources: Vast deposits of lignite coal underlay a large portion of the county. Building stone of the first quality is also found in inexhaustible quantities. One unique feature of Ekalaka is the fact that there is now being erected substantial buildings of native stone quarried from a hill just outside the town limits. Three large business houses and two churches, one costing $9,000, have been built within the last four years of this native stone. Geologists have also mapped Carter County as one of the most promising of the undeveloped oil fields of the state. Prospecting is now under way in the southern part of the county and considerable development is looked for in different localities in the near future. No doubt that Carter will ultimately take a prominent place among the oil producing counties of the state.

Timber: Two divisions of the Custer National Forest, consisting of 114,141 acres, furnish fuel and lumber for the farmers and town residents, a number of sawmills being operated in the forest.

Land Values: Land ranges in price from $5 to $25 an acre, values being low because of lack of transportation facilities.

Transportation and Highways: Carter County has no railroad within her borders, the county seat being an inland town 42 miles from the railway trading point. But with good roads, which are steadily being improved, the auto trucks handle the freight business satisfactorily and there is more "good roads" talk than railroad talk. Trade from the southern end of the county goes to Belle Fourche, South Dakota, and from the northern end to Baker, Montana.

Education: In addition to 60 rural schools, there is a county high school at Ekalaka, accredited for the four-year term. The building, a modern new structure, cost $14,000.

Cities and Towns: Ekalaka, the county seat, is growing steadily. The town has a wide-awake business circle, two general stores, grocery store, hardware store, harness and shoe shop, drug store, two very prosperous banks, two hotels, three cafes, a lumber yard, three garages, general repair shop, a live newspaper, the Ekalaka Eagle; a picture theater, a tailor, three lawyers, two physicians, dentist, reliable real estate firms, bonded abstract company, creamery, photographer and other lines of business. Alzada, near the Wyoming line, is the oldest town and the largest in the county, with the exception of Ekalaka. Other towns are Pinele, Capitol, Albion, Boyes, Belltower, Ridge and Stoneville.

Climatological: According to the weather bureau station at Ekalaka, the average temperature is 43.6 degrees and the average annual precipitation is 13.66 inches. Observations of 20 years record a frost-free period of 120 days.

Tourist Attractions: Carter County offers the tourist many attractions. Medicine Rocks near Ekalaka have been said to rival the famed "Garden of the Gods." The National Forest abounds in scenic beauty and during the year many thousands of people find rest and recreation within its confines. Health camps are also maintained during the summer months.

Crop Production: The value of all crops in Carter County in 1927 totaled $1,477,790, divided as follows: Spring wheat 18,000 acres, acre yield 19, production 342,000 bushels, value $331,740; winter wheat 1,000 acres, acre yield 19, production 19,000 bushels, value $17,480; all wheat 19,000 acres, acre yield 19, production 361,000 bushels, value $349,220; oats 9,000 acres, acre yield 40, production 360,000 bushels, value $158,400; barley 2,200 acres, acre yield 32, production 70,400 bushels, value $42,240; rye 2,500 acres, acre yield 17, production 45,500 bushels, value $31,025; flax seed 2,800 acres, acre yield 10.5, production 29,400 bushels, value $51,450; corn 10,000 acres, acre yield 28, production 280,000 bushels, value $201,600; potatoes 300 acres, acre yield 125, production 37,500 bushels, value $24,375; beans 550 acres, acre yield 18, production 9,900 bushels, value $29,700; alfalfa seed, 400 acres, acre yield 2.0, production 800 bushels, value $10,400; all tame hay 16,000 acres, acre yield 2.2, production 35,200 tons, value $295,680; wild hay 37,800 acres, acre yield 1.0, production 37,800 tons, value $283,500; truck crops and vegetables, value $200.

Livestock: Livestock products marketed in 1927 totaled $1,408,400. Combined crops and livestock were $2,886,190.

Value of Industries: The estimated value of manufacturing in 1927 was $47,000; lumbering, $8,370 (this includes value of lumber cut only. Value added by manufacture not included). The tourist trade contributed $70,000 to the county.

Total and Per Capita Production: The total production for the county is valued at $3,011,560 and the per capita production for 1927 at $877.

The assessed valuation of all property in the county in 1927 was $9 815,020 Real estate was valued at $7,470,000, livestock at $1,796,000 and other property at $549,000. The total taxable value was $2,970,415. The tax rate for county purposes was 20 mills on the taxable valuation and the school levy was 21.54 mills. Taxes are low, the average general tax for all purposes being but 8.4 cents an acre on farm and grazing land, 26.9 cents a head on horses, 45.6 cents a head on cattle and 14.7 cents a head on sheep. These amounts are all below averages for the state.

The net debt for county purposes June 30, 1924, was $172,592.16. This had been reduced by June 30, 1927, to $138,349, about 20 per cent. The net debt of school districts is small. It was reduced from $45,490.32 to $32,217.45 during the same three-year period. The per capita net debt for county and school purposes dropped from $54.90 in 1924 to $42.94 June 30, 1927.

Additional Information: For more detailed information about the resources of Carter County, write to the Ekalaka Chamber of Commerce, Ekalaka, Montana.

FALLON COUNTY

Date of Creation	Dec. 9, 1913	Est. County Population Jan. 1, 1928	4,507
Land Area	1,673 sq. miles	Population 1920	4,548
County Seat	Baker	Population County Seat 1920	1,060
Altitude County Seat	2,929 feet	Growing Season	107 Days

By C. C. Conser

ON the eastern border of the state, Fallon County has developed a high degree of diversification in farm production. While non-irrigated farming continues to be the chief industry, owing to the fact that a considerable portion of the surface is best adapted to grazing, cattle and sheep raising and dairying have developed with grain raising. During the last few years, the increase in butter fat and sheep and wool has been pronounced. However, grain production also has increased and in 1927, the county was among the million bushel counties.

Surface and Soil: The surface of the county is rolling, somewhat broken in parts, with broad and fertile valleys and uplands. The soil varies from heavy clay loam to a sandy clay loam. It handles easily and retains moisture remarkably well when properly handled. An area of heavy black clay along the Cedar Creek Anticline is not adapted to general farming. Sixty-two per cent of the county is tillable, the balance being adapted to grazing.

Crops: The chief crops are corn, wheat, flax, oats, barley, rye, alfalfa, sweet clover, potatoes, garden truck and small fruits. The county is in the corn belt of the state and fields of 50 to 100 acres are not uncommon. The wheat usually grades No. 1, Dark Northern and commands a premium. The acreage of corn and sweet clover is increasing rapidly.

Drainage and Water Supply: There are no rivers of importance in the county, but Fallon Creek and Pennel Creek, together with a number of smaller streams, flow through the county.

Industries: Agriculture and stock raising are the chief industries. A carbon black plant located at Baker utilizes the flow of natural gas for the manufacture of carbon black which is used in the making of printers' ink, automobile tires and many other industries.

Minerals: The county is underlaid with a good grade of lignite coal, which constitutes a considerable portion of the fuel used in the county. Natural gas is found in two fields in the Cedar Creek Anticline. The Baker gas field furnishes gas for fuel for Baker and Marmarth, N. D., and to manufacture carbon black. The extensive Cabin Creek field, through one hundred fifty miles of pipe lines, supplies Glendive, Miles City and Terry. The pipe lines are being extended to the cities in the Black Hills in South Dakota.

Timber: The county has no timber of merchantable grade, although the creeks are lined with ash, cottonwood and wild fruit. Many farmers are developing excellent groves. Bull pine covers a considerable acreage.

Land Values: Land can be purchased at prices ranging from $5 to $25 per acre, depending on tillable area, improvements and distance from railroads. The wide use of trucks is bringing the outlying districts within easy reach of markets.

Transportation and Highways: The county is crossed by the main line of the Chicago, Milwaukee, St. Paul and Pacific Railroad. A branch of the Northern Pacific serves the northeastern part of the county. Carter County, which is without a railroad, utilizes Baker as its main shipping point. The Yellowstone Highway parallels the Milwaukee Railroad and is surfaced with native scoria, an excellent road material. The other highways are generally good, some of the principal ones also being hard surfaced.

Education: The county has three high schools carrying a full four-year course, Baker, Plevna and Ollie, with a total enrollment of 200 pupils. There are four grade schools and fifty-two rural schools with an enrollment of 1,100 pupils.

Cities and Towns: Baker is the market town for eastern Fallon and most of Carter County. Next in size are Plevna, Ollie and Westmore, market towns in excellent farming sections.

Climatological: The average annual precipitation, based on observations at Plevna for 16 years, is 14.26 inches. Fifty-eight per cent of this falls in the months of April, May, June and July and is thus available for crop growth. The abundant summer sunshine accounts largely for the high nutrient quality of Fallon county hay, grass, forage crops and corn, as well as the high grade of Fallon County wheat.

Crop Production: The value of all crops in Fallon County totaled $2,780,035, divided as follows: Spring wheat 77,000 acres, acre yield 17, production 1,309,000 bushels, value $1,269,730; winter wheat 21,000 acres, acre yield 17, production 357,000 bushels, value $328,440; all wheat 98,000 acres, acre yield 17, production 1,666,000 bushels, value $1,598,170; oats 13,000 acres, acre yield 35, production 455,000 bushels, value $200,200; barley 7,200 acres, acre yield 31, production 223,200 bushels, value $133,920; rye 5,000 acres, acre yield 18, production 90,000 bushels, value $65,700; flax seed 6,900 acres, acre yield 11, production 75,900 bushels, value $132,825; corn 8,000 acres, acre yield 22, production 176,-

000 bushels, value $126,720; potatoes 500 acres, acre yield 145, production 72,500 bushels, value $47,125; beans 700 acres, acre yield 19, production 13,300 bushels, value $39,900; alfalfa seed 25 acres, acre yield 3.0, production 75 bushels, value $975; all tame hay 19,000 acres, acre yield 2.0, production 38,000 tons, value $319,200; wild hay 12,200 acres, acre yield 1.25, production 15,200 tons, value $114,000; truck crops and vegetables $1,300.

Livestock: Livestock products marketed in 1927 totaled $854,700. Combined crops and livestock are valued at $3,634,735.

Value of Industries: The estimated value of manufacturing in 1927 was $86,000 and tourist $95,000. The value of natural gas which is quite an item, is not included in the story of Fallon County.

Total and Per Capita Production: The total production for the county is valued at $3,815,735, and per capita production for 1927 at $847.

The assessed value of all property in Fallon County in 1927 was $12,909,849, of which $9,407,000 represented value of real estate and improvements, $660,000 value of livestock and $1,847,000 value of public utilities. The total taxable valuation of the county was $4,079,120.

For county purposes, the tax rate last year was 30.67 mills on taxable valuations. The average levy for school purposes was 27.01 mills. Taxes on farm and grazing lands averaged 13.8 cents an acre, on horses 49.6 cents a head, on cattle 74.1 cents a head, and on sheep 17.9 cents.

The county owed a net debt of $564,253 June 30, 1924. By June 30, 1927, this had been reduced to $494,471.55, a 12 per cent cut. During the same period, school districts reduced total net debt from $76,885.10 to $61,305, or more than 20 per cent. The per capita net debt for county and school purposes was $122.20 June 30, 1927.

Fallon County has a county agent located at Baker, Montana.

Additional Information: For more detailed information about the resources of Fallon County, write the Chamber of Commerce, Baker, Montana.

CUSTER COUNTY

Date of Creation.....Feb. 16, 1877	Est. County Population Jan. 1, 1928...11,224
Land Area... .....3,788 sq. miles	Population 1920.....12,194
County Seat.....Miles City	Population County Seat 1920..... 7,937
Altitude County Seat.....2,371 feet	Growing Season.....126-148 Days

By J. H. Bohling

ONE of the original counties of the state, Custer lies in the southeastern part of Montana. Until recent years it was much larger in area but a number of counties have been cut off until it is reduced to its present size, being 70 miles in length north and south and 60 miles wide.

Surface and Soil: The topography of the county is somewhat irregular, being rolling, broken country with pronounced breaks along the Tongue and Yellowstone Rivers. The soil ranges from a sandy loam to a heavy clay and is generally underlaid with a clay subsoil.

Crops: Wheat, corn, oats, barley, rye, sweet clover, alfalfa, beans, alfalfa seed, and all root crops are successfully grown. Truck crops, corn and alfalfa are grown under irrigation in the valley. The type of crops depends upon the location. An irrigation system extending from 14 miles south of Miles City on the Tongue River to eight miles north on the Yellowstone comprises 10,000 acres.

Drainage and Water Supply: The Yellowstone River cuts the county in two, flowing northeast and having as feeders Powder and Tongue Rivers, which drain the entire southern portion of the county. The water supply is sufficient in most sections of the county for both domestic and livestock use.

Industries: Stock raising, dairying and agriculture are the chief industries. The principal industry in Miles City, the county seat, centers around the shops of the Chicago, Milwaukee, St. Paul and Pacific Railroad. The Yale Oil Company operates a refinery at this point and Armour's a creamery.

Mineral Resources: Lignite coal deposits are found in nearly every area in the county and supply sufficient fuel for local consumption. Miles City is also served by natural gas.

Timber: The timbered section is confined to the southern and eastern portions, which supply lumber, posts and fuel for local purposes.

Transportation and Highways: Custer County has two transcontinental railroads which furnish excellent marketing facilities for local products. The Yellowstone Trail and National Parks Highways pass through the county, paralleling the railroads.

Land Values: The land varies in value from $150 an acre for irrigable land to $1.50 an acre for the poorer types of grazing land.

Education: There are 63 schools in the county, with a total enrollment of 2,530. This includes the high school located in Miles City.

Cities and Towns: Ismay is the only incorporated town in the county, outside of the county seat. Other towns are Kinsey, Beebe, Shirley, Ulmer and Calabar. The U. S. Range Livestock Experiment Station of 57,000 acres is located near Miles City, at which place experiments in cattle, sheep, horses and hogs are now being conducted.

Climatological: Observations over a period of 34 years give the county an average of 152 days' growing season. The average annual precipitation is 13.96 inches, the greatest rainfall occurring in June. The mean average annual temperature is 45.5.

Crop Production: Crop production in Custer County in 1927 is valued at $1,457,069, as follows: Spring wheat 24,000 acres, acre yield 19, production 456,000 bushels, value $442,320; winter wheat 3,000 acres, acre yield 17, production 51,000 bushels, value $46,920; all wheat 27,000 acres, acre yield 18.8, production 507,000 bushels, value $489,240; oats 9,000 acres, acre yield 39, production 351,000 bushels, value $154,440; barley 3,200 acres, acre yield 31, production 99,200 bushels, value $59,520; rye 800 acres, acre yield 16, production 12,800 bushels, value $9,344; flax seed 2,800 acres, acre yield 10, production 28,000 bushels, value $49,000; corn 12,000 acres, acre yield 23, production 276,000 bushels, value $198,720; potatoes 900 acres, acre yield 125, production 112,500 bushels, value $73,125; beans 550 acres, acre yield 18, production 9,900 bushels, value $29,700; alfalfa seed 1,875 acres, acre yield 2.0, production 3,750 bushels, value $48,750; all tame hay 17,000 acres, acre yield 1.6 tons, production 27,200 tons, value $228,480; wild hay 13,500 acres, acre yield 1.1, production 14,800 tons, value $111,000; truck crops and vegetables $1,500 and sugar beets, 50 acres, acre yield 10.0, production 500 tons, value $4,250.

Livestock: Livestock products marketed in 1927 totaled $1,691,700 and placed Custer County ninth. Combined crops and livestock totaled $3,148,769.

Value of Industries: The estimated value of the various industries of the county for 1927 is as follows: Manufacturing, $1,937,000, and tourist $290,000.

Total and Per Capita Production: The total production for the county is valued at $5,375,769 and per capita production for 1927 at $479.

The county agent is located at Miles City.

Real estate and improvements were assessed in 1927 at $16,673,000, livestock at $1,040,000 and public utilities at $4,898,000. The total value of all property was $26,092,412 with a taxable valuation of $8,331,252.

The tax rate for county purposes last year was 25.5 mills on the taxable valuation, and the average rate for school purposes was 26.51 mills. The average tax for all general purposes was 7.3 cents an acre on farm and grazing lands, 35.7 cents a head on horses, 61.0 cents a head on cattle, 18.2 cents a head on sheep.

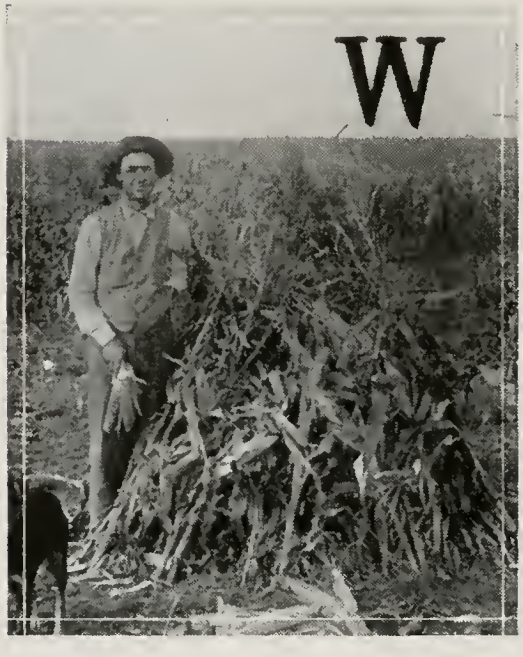
Net indebtedness of the county amounted to $485,556.29 June 30, 1924. By June 30, 1927, this had been reduced to $374,307.45, a decrease of 23 per cent. School districts did even better, reducing their net indebtedness from $174,923.72 to $109,927.42, about 37 per cent, during the same three-year period. The per capita net debt for county and school purposes June 30, 1927, was only $39.71, much below the average for the state.

Additional Information: For more detailed information about the resources of Custer County, write the County Agent or the Commercial Club, Miles City, Montana.

ROSEBUD COUNTY

Date of Creation	Feb. 11, 1901	Est. County Population Jan. 1, 1928	7,276
Land Area	5,067 sq. miles	Population 1920	8,002
County Seat	Forsyth	Population County Seat	1,800
Altitude of County Seat	2,515 feet	Growing Season	145 Days

By Ralph D. Mercer



WITH a production that gave the county second place for 1927, corn is truly a major crop in Rosebud County, located in the heart of the Montana corn belt. The livestock industry of the county which produces fifty per cent of the gross income of the county, prospers in the range territory both north and south of the Yellowstone River. Excellent quality of mutton, wool and beef are produced here. Hogs are increasing rapidly. Twenty-five thousand acres are under irrigation in three projects along the Yellowstone River. In addition to this acreage there are several thousand acres of alfalfa land along the creeks that are irrigated annually. The Custer National Forest supplies grazing for a number of the cattlemen in the southern part of the county.

Soils: Most of the soils on the benchlands are a sandy loam with clay subsoil. In the valleys a chocolate loam. Some sections of the county have heavy soils but this land is used mostly for grazing purposes. The topography of the county is mostly rolling with some flat benchland.

Crops: Corn, wheat, alfalfa hay and seed, oats, barley, beans and potatoes. In the irrigated sections much attention is given to beets, beans and truck crops. Between 20 and 30 cars of alfalfa seed are shipped out of the county annually.

Drainage and Water Supply: The county is drained by the Yellowstone and Tongue Rivers, and a number of creeks which flow into these larger bodies. The Yellowstone River flows east through the center of the county while Tongue River flows northeast from the southern part of the county. Water supplies are to be found in most sections of the county at moderate depths.

Industries: The chief industries of the county are coal mining, stock raising and farming.

Mineral Resources: Large deposits of semi-bituminous coal are found in the county. One large strip mine at Colstrip, 15 miles square, is operated to supply the Northern Pacific Railroad with coal in this section.

Timber: Most of the timber is south of the Yellowstone. The Custer National Forest is located in the southern part of the county. Shelterbelt plantings are being made on many of the bench farmsteads.

Land Values: Irrigated land in the county is priced from $40 up and non-irrigated land from $10 up. There is a large acreage suitable only for grazing, which is priced according to its carrying capacity.

Transportation: The main lines of the Northern Pacific and Chicago, Milwaukee, St. Paul and Pacific Railways traverse the county from east to west. A forty-mile branch line of the Northern Pacific taps the southern part of the county to Colstrip. The Yellowstone Trail runs through the county from east to west and the Electric Trail runs northwest through the western half. Twenty-five miles of the Yellowstone Trail is graveled. Excellent graded roads make up the remainder of these trails.

Education: There are 58 schools in the county, including six high schools, with a total enrollment of 1,650.

Cities and Towns: Forsyth, the county seat, is located in the central part of the county in the Yellowstone River Valley, and on both railroad lines. Rosebud, Hathaway, and Finch are towns on the Northern Pacific Railroad, and Thurlow, Carterville, Vanada, Ingomar and Sumatra along the Milwaukee. Ashland, an inland town 65 miles south of Forsyth, is the trading point for a large area in this section.

Climatological: The climate is ideal. The winters are mild. Two weeks of sub-zero weather is the maximum in the average year. The summers are warm with a maximum number of days of sunshine. Average annual rainfall, 14.0 inches.

Crop Production: Rosebud County stands second in production of corn with a crop valued at $349,920. Value of all crops is $2,783,329, divided as follows: Spring wheat 45,000 acres, acre yield 19, production 855,000 bushels, value $829,350; winter wheat 15,000 acres, acre yield 15, production 225,000 bushels, value $207,000; all wheat 60,000 acres, acre yield 18, production 1,080,000 bushels, value $1,036,350; oats, 11,000 acres, acre yield 39, production 429,000 bushels, value $188,760; barley 2,200 acres, acre yield 29, production 63,800 bushels, value $38,280; rye 3,800 acres, acre yield 21, production 79,800 bushels, value $58,254; flax seed 1,400 acres, acre yield 10, production 14,000 bushels, value $24,500; corn 18,000 acres, acre yield 27, production 486,000 bushels, value $349,920; potatoes 700 acres, acre yield 138, production 96,600 bushels, value $62,790; beans 5,750 acres, acre yield 15.7, production 90,000 bushels, value $270,000; alfalfa seed 550 acres, acre yield 2.25; production 1,225 bushels, value $15,925; all tame hay 25,000 acres, acre yield 2.2, production 55,000 tons, value $462,000; wild hay 20,300 acres, acre yield 1.15, production 23.300 bushels, value $174,750; truck crops and vegetables, value $20,200, and sugar beets 800 acres, acre yield 12.0, production 9,600 tons, value $81,600.

Livestock: Livestock products marketed in 1927 totaled $1,748,900. Combined crops and livestock were valued at $4,532,229.

Value of Industries: The estimated value of manufacturing is $516,000, lumbering $32,550 (includes value of lumber cut only. Value added by manufacturing not included); coal mining $1,904,850, tourist $170,000.

Total and Per Capita Production: The total production of the county is valued at $7,155,629 and per capita production for 1927 at $983.

The assessed value of all property in 1927 was $23,072,869, with real estate and improvements valued at $12,780,000, livestock at $1,380,000, public utilities at $7,280,000 and net proceeds of mines at $366,600. The total taxable valuation was $8,000,664.

The county tax levy was 27.5 mills on the taxable value last year and the average levy for school purposes was 25.61 mills. The average tax on farm and grazing lands was 7.2 cents an acre, on horses 40.3 cents a head, on cattle 58.3 cents a head, and on sheep 17.2 cents.

The net indebtedness of the county June 30, 1927, was $675,117.23, the net indebtedness of school districts was $408,686.11, and the per capita net debt for county and school purposes was $135.44.

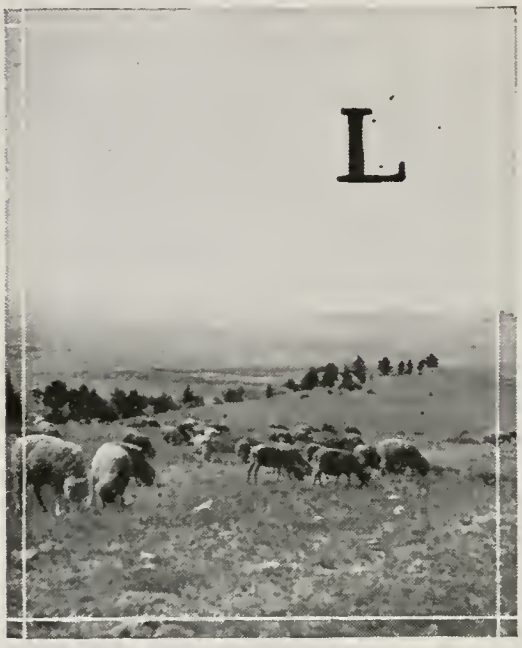
Rosebud County has a county extension agent and a home demonstration agent, both located at Forsyth.

Additional Information: For more detailed information regarding the resources of Rosebud County, write to the County Agent, Forsyth, Montana.

TREASURE COUNTY

Date of Creation	April 1, 1919	Est. County Population Jan. 1, 1928	1,066
Land Area	998 sq. miles	Population 1920	1,700
County Seat	Hysham	Population County Seat	360
Altitude County Seat	2,667 feet	Growing Season	May 1 to Sept. 15

By W. O. Ensign



LOCATED in the south central part of Montana, Treasure County contains approximately 1,000 square miles, and is the second smallest exclusively agricultural county in the state, but the fourth as to per capita production of wealth. Stock raising and agriculture, the principal occupation of its inhabitants, has been brought to a high state of production. It has 20,000 acres of irrigated land along the Yellowstone, Sarpy and Tullock Valleys. Five irrigation projects are located in the county, north of the Yellowstone River is the North Sanders District; at Hysham the Yellowstone and Box Elder Districts, and at Big Horn the Big Horn-Tullock District and on Pease Bottom the Rancher Ditch, one of the most economically managed ditches in the United States.

Surface and Soil: Irrigable and agricultural lands comprising 225,000 acres are level and gently rolling, mostly sandy loam with very little gumbo and heavy soil. Grazing land comprising 227,000 acres is mostly good grass land with very little gravel.

Crops: Sugar beets are generally grown along the Yellowstone River and produce an exceptionally large and profitable tonnage. Wheat, corn, beans, alfalfa seed are the chief crops on the non-irrigated lands, and are grown in large quantities.

Drainage and Water Supply: County is drained by adequate tributaries running into the Yellowstone River from the north and south. Good water is obtained from wells and springs.

Industries: Farming and raising of livestock are the principal industries. Large shipments of cream are made to adjacent creameries. Poultry and turkeys are also shipped to outside markets.

Mineral Resources: South of the Yellowstone River large coal deposits occur. They are being mined for local consumption. A large deposit of bentonite is the only other known mineral in the county.

Timber: Heavy stands of cottonwood along rivers and creeks, and pines on the hillsides.

Land Values: Irrigable land is priced at $50 to $100 per acre, and agricultural lands at $10 to $25. Grazing land is worth $3 to $5 per acre.

Transportation and Highways: The main line of the Northern Pacific traverses the county from east to west. The Yellowstone Trail is the main highway with adequate connecting roads north and south.

Education: The county has 18 schools, with grade and high school at Hysham where 250 students are enrolled, with 90 in the high school department.

Cities and Towns: Hysham, the county seat of Treasure County, has a population of 350, with bank, newspaper, theater and stores. Other towns in the county are Myers, Sanders and Big Horn.

Climatological: Seasons are comparatively mild as shown by the long growing season. Annual precipitation about 14 inches, with 10 inches during the growing season.

Crop Production: The value of all crops in Treasure County totaled $1,147,485, divided as follows: Spring wheat 14,000 acres, acre yield 22, production 308,000 bushels, value $298,760; winter wheat 9,000 acres, acre yield 20, production 180,000 bushels, value $165,600; all wheat 23,000 acres, acre yield 21.2, production 488,000 bushels, value $464,360; oats, 4,000 acres, acre yield 50, production 200,000 bushels, value $88,000; barley 2,200 acres, acre yield 28, production 61,600 bushels, value $31,960; rye 1,300 acres, acre yield 20, production 26,000 bushels, value $18,980; flax seed 400 acres, acre yield 10.5, production 4,200 bushels, value $7,350; corn 3,000 acres, acre yield 27, production $1,000 bushels, value $58,320; potatoes 300 acres, acre yield 140, production 42,000 bushels, value $27,300; beans 700 acres, acre yield 13, production 9,100 bushels, value $27,300; alfalfa seed 550 acres, acre yield 2.25, production 1,225 bushels, value $15,925; all tame hay 12,000 acres, acre yield 2.3, production 27,600 tons, value $231,840; wild hay 1,300 acres, acre yield 1.75. production 2,300 tons, value $17,250; truck crops and vegetables, $900, and sugar beets 1,500 acres, acre yield 12.0, production 18,000 tons, value $153,000.

Livestock: Livestock products marketed in 1927 totaled $529,500. Combined crops and livestock were valued at $1,676,985.

Value of Industries: The estimated value of manufacturing was $225,000 and of tourist, $122,000.

Total and Per Capita Production: The total production for the county is valued at $2,023,985. Per capita for 1927 is $1,265, placing Treasure County fourth.

The assessed value of all property in the county in 1927 was $6,647,762, with real estate and improvements assessed at $4,474,654, livestock at $290,925 and public utilities at $1,598,473. The total taxable value of all property was $2,160,809.

Th levies last year were considerably below the state average. The rate for county purposes was only 16.0 mills on the taxable valuation, and the average school rate was but 18.7 mills. Taxes for all genral purposes averaged 9.2 cents an acre on farm and grazing lands, 26.9 cents a head on horses, 40.3 cents a head on cattle, and 13.9 cents a head on sheep.

The net debt of the county was reduced from $68,927.54 to $53,877.63, nearly 22 per cent, during the three years ended June 30, 1927. The net debt of school districts during the same period dropped from $60,676.06 to $57,703.99, making the per capita net debt for county and school purposes $56 07, slightly below the state average, June 30, 1927.

Additional Information: For more detailed infcrmation about the resources of Treasure County, write to State Publicity Division, Helena, Montana.

POWDER RIVER COUNTY

Date of Creation.....April 1, 1919	Est. County Population Jan. 1, 1928....3,058
Land Area.....3,276 sq. miles	County Population 1920.....3,357
County Seat.....Broadus	Population County Seat..... 150
Altitude County Seat.....3,030 feet	Growing Season.....April to September

By Edwin A. Jones

IN SOUTHEASTERN Montana, Powder River County comprises approximately 2,073,600 acres. The northern and eastern districts are largely composed of rolling prairie land with pine and cedar brakes. A low range of timbered mountains and the Custer National Forest occupy a considerable area of the western part of the county, and this district will always be best adapted to stock raising.

Surface and Soil: The western and southern portions of the county are rough, with broken surface, and used largely for grazing. Sandy soil is found on the river bottoms, while the scil in those districts adapted to agriculture is chiefly a deep, fertile loam.

Crops: Spring wheat is the chief crop, but the acreage in corn for both feed and grain is rapidly expanding, the long, hot growing season making the crop particularly adapted to the district. Melons and vegetables do well, and on the river and creek bottoms alfalfa is successfully raised without irrigation. Oats, barley, rye, flax, sweet clover, millet and hay are also profitable crops. Powder River County is rapidly coming to the fore as a producer of high quality alfalfa seed.

Drainage and Water Supply: The Powder River runs northeasterly through the county. Into it flows the Little Powder River, which drains the southern portion of the county. Otter Creek, Pumpkin Creek and Mizpah River are other streams which flow more or less during the year. Numbers of artesian wells, developing a good flow, have been brought in.

Industries: Stock raising is the chief industry of the county. During the past 20 years many homesteaders have come in. In the past few years there has been a pronounced movement to concentrate on crops of relatively small bulk and high valuc, thus partly overcoming the long haul to the railroad.

Mineral Resources: The coal resources are extensive, occupying the western three-fourths of the county.

Timber: Some commercial stands of timber. Cottonwood, wild plum, box elder, ash, pine and cedar.

Land Values: Land suited for agricultural purposes sells at from $10 per acre and up. Grazing land is lower.

Transportation and Highways: A stage line operates between Broadus and Miles City, a distance of 90 miles. There are no railroads in the county. On June 1, 1928, there was completed six miles of the first Federal highway. There is a possibility of a railroad being built from Casper, Wyoming, down the Tongue River to Miles City, which will reduce by more than half the present distance to the railroad.

Education: Number of rural schools, 55; high schools, 1. Enrollment, 711.

Climatological: According to the weather bureau station at Biddle, the average temperature for Powder River County is 44.1 degrees and the average annual precipitation is 15.4 inches. An observation of 14 years records a frost-free period of 117 days.

Crop Production: The value of all crops in 1927 was $1,180.690, divided as follows: Spring wheat 9,000 acres, acre yield 18, production 162,000 bushels, value $157,140; winter

wheat 1,000 acres, acre yield 20, production 20,000 bushels, value $18,400; all wheat 10,000 acres, acre yield 18.2, production 182,000 bushels, value $175,540; oats 7,000 acres, acre yield 40, production 280,000 bushels, value $123,200; barley 2,200 acres, acre yield 35, production 77,000 bushels, value $46,200; rye 600 acres, acre yield 20, production 12,000 bushels, value $8,760; flax seed 1,400 acres, acre yield 10.2, production 14,300 bushels, value $25,025; corn 7,000 acres, acre yield 26, production 182,000 bushels, value $131,040; potatoes 600 acres, acre yield 125, production 75,000 bushels, value $48,750; beans 1,300 acres, acre yield 12, production 15,600 bushels, value $46,800; alfalfa seed 3,150 acres, acre yield 1.5, production 4,725 bushels, value $61,425; all tame hay 30,000 acres, acre yield 1.5, production 45,000 tons, value $378,000; wild hay 16,300 acres, acre yield 1.1, production 17,900 tons, value $134,250; truck crops and vegetables $1,700.

Livestock: The value of livestock products marketed in 1927 totaled $1,318,200. Combined crops and livestock totaled $2,498,890.

Value of Industries: The estimated value of manufacturing in 1927 was $17,000, lumbering $25,110 (includes value of lumber cut only. Value added by manufacturing not included), and tourist $77,000.

Total and Per Capita Production: Total production is valued at $2,618,000 and per capita for 1927 at $856.

Real estate and improvements were assessed in 1927 at $7,077,474, and livestock at $1,414,996. The total value of all property was $8,885,247, with a taxable value of $2,715,802.

The tax rate for county purposes last year was 19.75 mills on the taxable valuation, and the average rate for school purposes was 23.28 mills. The average tax on farm and grazing lands was 8 2 cents an acre, on horses, 35.5 cents a head, on cattle 47.9 cents a head, and on sheep 17.9 cents. All of these amounts are below the average for the state.

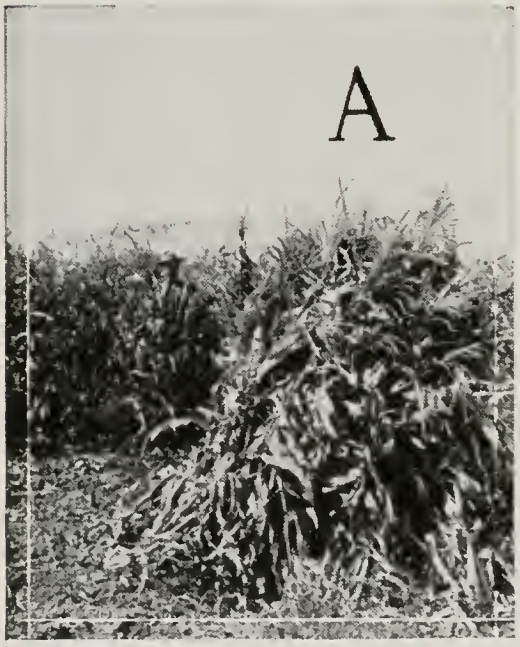
The net debt for county purposes amounted to $118,835.65, and the net debt of all school districts totaled only $26,122.32, the second lowest in the state, June 30, 1927. The per capita net debt for county and school purposes on that date was $43.18, considerably below the average throughout the state.

Additional Information: For more detailed information about the resources of Powder River County, write to the state publicity division, Helena, Montana.

BIG HORN COUNTY

Date of Creation	Jan. 13, 1913	Est. County Population Jan. 1, 1928	9,569
Land Area	5,116 sq.miles	Population 1920	7,013
County Seat	Hardin	Population County Seat	2,000
Altitude County Seat	2,966	Growing Season	110-132 Days

By Carl Rankin



ADJOINING the northeastern boundary of Wyoming, Big Horn County is located in southeastern Montana, in the famous Crow Indian country. It lies between the Big Horn Mountain Range on the west and south, the Wolf Mountains on the east and the Pine Ridge on the north. The Big Horn, Little Big Horn and Rosebud River Valleys, with numerous tributaries to each, comprise one of the most fertile basins in Montana. Nourishing grasses, timber, coal, and other mineral products are found in abundance. All valleys are irrigated from canals with ample water supply; the benches and table lands are of the best non-irrigated lands found in the northwest and stock raising advantages are unsurpassed.

Surface and Soil: The surface is broken by numerous rivers and streams, where are formed extensive benches and table lands, most suitable for growing winter wheat. The hill lands are well grassed and in many places well timbered. The soil which is of a sandy clay loam, is very fertile, productive, easily worked and is noted for its moisture-retaining qualities.

Crops: The principal crops under irrigation are alfalfa, clover, timothy, wheat, oats, barley, sugar beets, beans, potatoes, tomatoes, melons, and all classes of vegetables; also small fruits, such as strawberries, raspberries, blackberries, currants, etc. On the non-irrigated benches and table lands are grown abundantly winter wheat, spring wheat, flax, rye, barley, speltz, corn, alfalfa and sweet clover seed, and most root crops.

Drainage and Water Supply: The Big Horn River traverses the county from south to north, and the Little Big Horn River from the southeast to the northwest, joining the Big Horn River near Hardin. Both rivers are fed by numerous tributaries draining the watershed of the Big Horn and Wolf Mountains, which furnish abundant pure, clear cold mountain water for irrigation and stock purposes. The Tongue River flows through the southeastern part of the county.

Industries: Farming—irrigated and non-irrigated—and stock raising are the principal industries, both carried on very extensively and profitably. The Campbell Farming Corporation owns and has under lease 65,000 acres on the Crow Reservation, of which 40,000 annually is in high state of cultivation, on which only the latest and most up-to-date machinery and methods are used. The great wheat and flax fields are the wonder sights of the county from a large-scale viewpoint.

Lumbering, coal mining, oil and gas industries are carried on extensively and Big Horn County is the largest honey producing county in the State of Montana, shipping many carloads annually.

Timber: Large areas of merchantable timber are available and numerous sawmills operate throughout the area.

Land Values: Improved irrigated farms range in price from $30 to $100 per acre. Improved non-irrigated farms range from $10 to $40 per acre, depending on location. Grazing lands range from $4 to $10 per acre. Inherited Indian lands on the Crow Reservation, which is included in this county, are sold from time to time at public auction at very reasonable prices and on terms.

Transportation and Highways: The main line of the Chicago, Burlington and Quincy Railroad traverses the county from southeast to northwest, serving Omaha, Kansas City and Chicago markets east, and Pacific Coast markets west. A hard surfaced Federal highway extends from Hardin 60 miles southeast to the Wyoming line, in addition to 300 miles of graded county roads. All streams are bridged with substantial structures. Other Federal projects are contemplated.

Education: There are 38 schools, including four high schools, in the county, with an average attendance of 1,665 pupils. Most of the schools are in session nine and one-half months of the year. School taxes do not vary greatly and are not excessive.

Cities and Towns: The following towns located on the Burlington Railroad are Hardin, the county seat, Crow Agency, Lodge Grass, Wyola, Corinth, St. Xavier, 24 miles south of Hardin.

Climatological: Moderate winters prevail with clear, bright sunshiny days; ample snows insure abundant moisture. Summers have moderate day temperatures with cool nights. The annual rainfall is about 17 inches, well distributed over the growing season.

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Crop Production: Crop production in Big Horn County in 1927 is valued at $3,016,303, as follows: Spring wheat 32,000 acres, acre yield 20, production 640,000 bushels, value $620,800; winter wheat 31,000 acres, acre yield 18, production 558,000 bushels, value $513,360; all wheat 63,000 acres, acre yield 19, production 1,198,000 bushels, value, $1,134,160; oats 9,000 acres, acre yield 40, production 360,000 bushels, value $158,400; barley 5,400 acres, acre yield 34, production 183,600 bushels, value $110,160; rye 1,300 acres, acre yield 20, production 26,000 bushels, value $18,980; flax seed 5,600 acres, acre yield 7.5, production 42,000 bushels, value $73,500; corn, 7,000 acres, acre yield 21, production 147,000 bushels, value $105,840; potatoes 500 acres, acre yield 130, production 65,000 bushels, value $42,250; beans 7,600 acres, acre yield 17, production 129,200 bushels, value $387,600; alfalfa seed 500 acres, acre yield 2.0, production 1,000 bushels, value $13,000; all tame hay 31,000 acres, acre yield 2.5, production 77,500 tons, value $651,000; wild hay 16,300 acres, acre yield 1.2, production 19,600 tons, value $147,000; truck crops and vegetables, value $6,300, and sugar beets 2,000 acres, acre yield 10.5, production 20,925 tons, value $177,863.

Livestock: Livestock products marketed in 1927 totaled $1,447,800. Combined crops and livestock were valued at $4,464,103.

Value of Industries: The estimated value of the various industries of the county for 1927 is as follows: Manufacturing, $121,000; lumbering, $20,460 (includes value of lumber cut only. Value added by manufacturing not included), and tourist $165,000.

Total and Per Capita Production: The total production for the county is valued at $4,770,536 and per capita production for 1927 at $499.

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Assessment statistics for 1927 show real estate and improvements valued at $8,313,000, livestock at $2,636,000 and public utilities at $4,836,000. The value of all property totals $16,992,849, with a taxable valuation of $5,660,462. The tax rate for county purposes was 30.5 mills and for school purposes it averaged 23.38 mills on the taxable valuation. The tax on farm and grazing land was 11.5 cents per acre—2½ cents below the state average. The tax on horses was 54.0 cents per head, on cattle 68.9 cents per head, and on sheep 17.3 cents.

The net debt of the county on June 30, 1927, was $480,279.31 and the total net debt of district schools was $247,514.

Additional Information: For more detailed information about the resources of Big Horn County write to Chamber of Commerce, Hardin, Montana.

SOUTH CENTRAL MONTANA

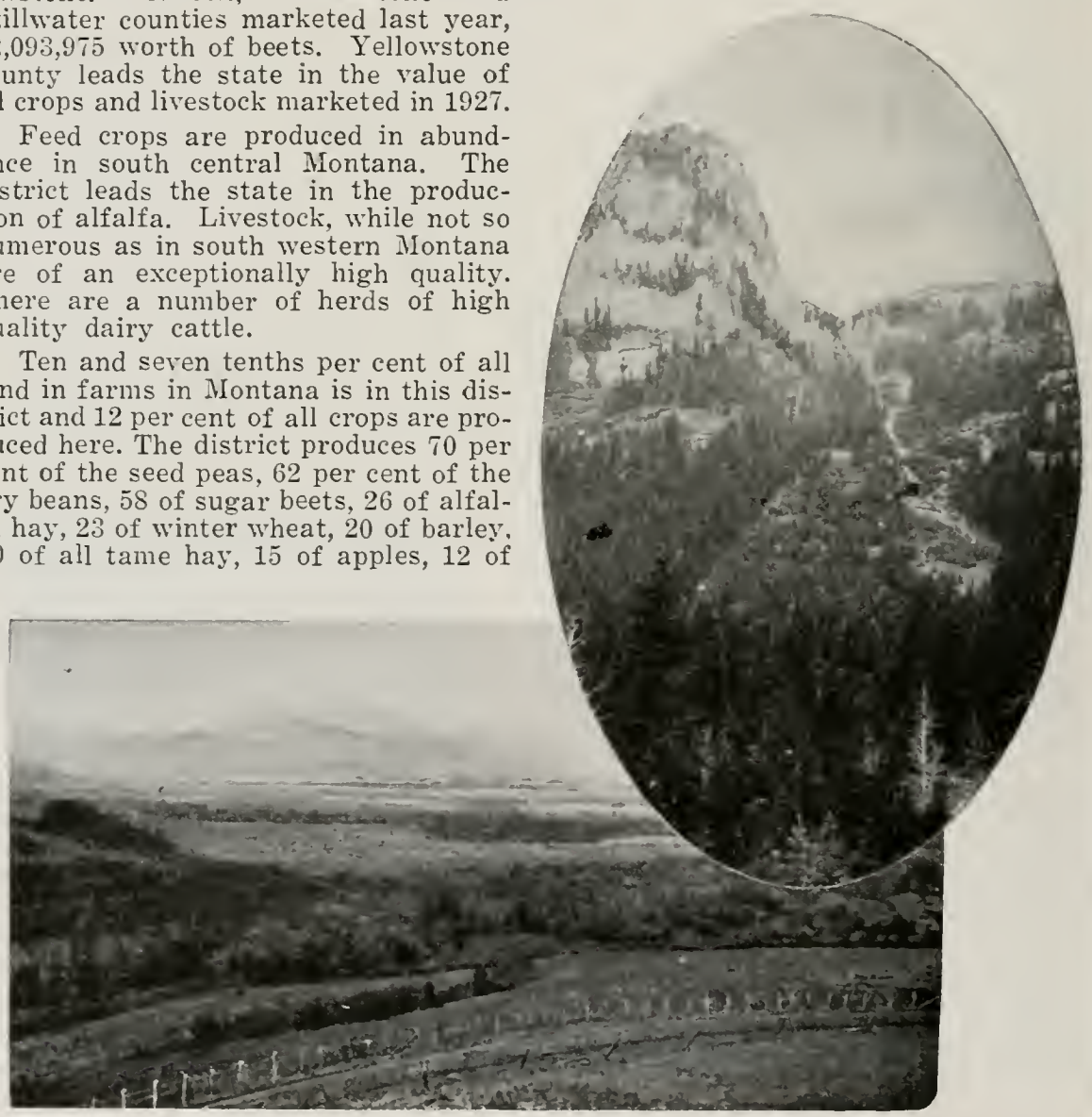
Combines Characteristics of Both the Eastern Slope and Plains Regions —Includes Two of the Best Known Agricultural Districts— Tourist Attractions and Minerals.

South Central Montana, composed of Yellowstone, Carbon, Stillwater, Sweet Grass, Park and Gallatin counties combines the characteristics of the plains regions of Montana with those of the eastern slope or mountain region. The northeastern portion is a part of the broad valley of the Yellowstone and the southern and western portions are mountainous.

The best known agricultural districts are the Yellowstone and Gallatin valleys where farming has long been followed and where diversification has been well established. Both irrigated and non-irrigated methods are followed. In the irrigated sections sugar beets and canning peas are important crops. The district leads the state in the production of both. Sugar beets were first introduced into Montana in the valley of the Yellowstone. Carbon, Yellowstone and Stillwater counties marketed last year, $2,093,975 worth of beets. Yellowstone county leads the state in the value of all crops and livestock marketed in 1927.

Feed crops are produced in abundance in south central Montana. The district leads the state in the production of alfalfa. Livestock, while not so numerous as in south western Montana are of an exceptionally high quality. There are a number of herds of high quality dairy cattle.

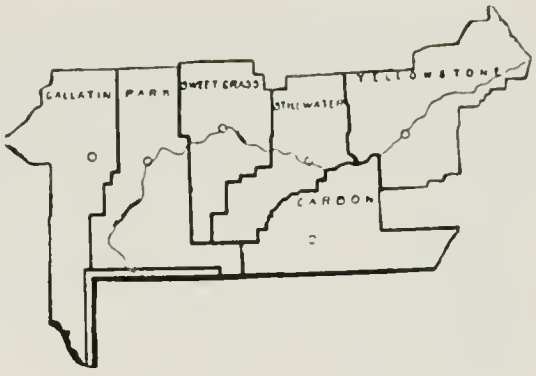
Ten and seven tenths per cent of all land in farms in Montana is in this district and 12 per cent of all crops are produced here. The district produces 70 per cent of the seed peas, 62 per cent of the dry beans, 58 of sugar beets, 26 of alfalfa hay, 23 of winter wheat, 20 of barley, 20 of all tame hay, 15 of apples, 12 of



oats, 11 of all wheat, 10 of corn and 10 of potatoes, eight of spring wheat, four of rye, two of wild hay, one of flax and one per cent of the alfalfa seed.

Industrial activities of the district include the manufacture of beet sugar, and flour milling. There is an oil refinery in Billings and canneries in Gallatin, Stillwater, Carbon and Yellowstone counties.

In the southwestern part there are varied mineral resources which include one of the largest deposits of chrome ore in the United States. The district is second in the production of coal. There is considerable undeveloped waterpower.

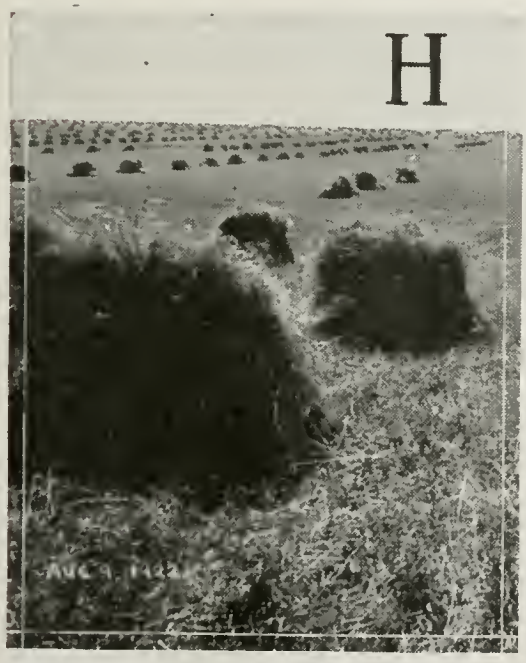


The northern, or Gardiner entrance to the Yellowstone Park, is within this area, and the new Gallatin Way to the park runs through the western portion. In 1927 Park and Yellowstone counties were second and third respectively in the value of tourist trade for the year.

SWEET GRASS COUNTY

Date of Creation,.....Mar. 5, 1913	Est. County Population Jan. 1, 1928...4,176
Land Area,.....1,855, sq. miles	Population of County, 1920.....4,926
County Seat,.....Big Timber	Population of County Seat,.....1,282
Altitude of County Seat,.....4,072 feet	Growing Season,.....112-122 days

By R. A. Bray



HAVING large areas of land naturally adapted to livestock raising, as well as important agricultural areas, Sweet Grass County furnishes opportunities to the settler interested in tilling the soil or in building up a cattle and sheep growing industry.

Surface and Soil: Extending through the county lay the Yellowstone Valley which is about 55 miles long and from two to five miles wide; also the valleys of the Boulder, Big Timber, Sweet Grass, American Fork and Otter Creeks. These valleys form the agricultural districts. The soil varies from a deep black loam to a light soil with a gravel subsoil.

Crops: Tame hay is the principal crop, with wheat the principal cash crop. Oats, barley, rye, corn and potatoes are also raised successfully. Nearly every farm in the county raises small fruits and all varieties of truck crops.

Drainage and Water Supply: The Yellowstone River flows from west to east nearly through the center of the county. On the north the land rises to the Crazy Mountains in which the Big Timber, Sweet Grass and Otter Creeks rise, while on the south the land rises from the level of the river to a high range of mountains in which the Boulder and Stillwater Rivers head.

Industries: Cattle and sheep growing, together with agriculture, form the important industries.

Mineral Resources: Chromite has been found in commercial quantities. Coal and Iceland spar have been found in much lesser quantities.

Timber: The chief timbered area is in the southern end, 200,273 acres of the county being included within the Beartooth National Forest. Less important areas are found in the Crazy Mountains in the northwestern part.

Land Values: Irrigated lands range in price from $45 to $115 an acre; non-irrigated farming lands from $10 to $25 an acre and grazing land from $5 to $10.

Transportation and Highways: The main line of the Northern Pacific parallels the Yellowstone through the county, as do all the main transcontinental highways.

Education: There are 61 schools in the county, including a high school at Big Timber, the total enrollment being 1026.

Cities and Towns: Big Timber, the largest town and chief distributing point is also the county seat. It is in the center of a rich region. Melville and McLeod are other important towns.

Climatological: The annual temperature is 46.3 degrees and the average annual precipitation is 15.36 inches. Observations over a period of 17 years record an annual frost-free period of 114 days.

Crop Production: The value of all crops in 1927 was $1,700,744, divided as follows: Spring wheat 30,000 acres, acre yield 21, production 630,000 bushels, value $611,100; winter wheat 4,000 acres, acre yield 22, production 88,000 bushels, value $80,960; all wheat 34,000 acres, acre yield 21.1, production 718,000 bushels, value $692,060; oats 8,000 acres, acre yield 43, production 344,000 bushels, value $151,360; barley 1,000 acres, acre yield 38, production 38,000 bushels, value $22,800; rye 1,300 acres, acre yield 16, production 20,800 bushels, value $15,184; corn 1,000 acres, acre yield 22, production 22,000 bushels, value $15,840; potatoes 300 acres, acre yield 155, production 46,500 bushels, value $30,-225; all tame hay 37,000 acres, acre yield 2.3, production 85,100 tons, value $714,840; wild hay 6,800 acres, acre yield 1.1, production 7,500 tons, value $56,250; apples 1,450 bushels, value $1,885; truck crops and vegetables $300.

Livestock: Livestock products marketed in 1927 were valued at $1,587,600. Combined crops and livestock totaled $3,288,344.

Value of Industries: The estimated value of manufacturing was $91,000, lumbering $10,230 (includes value of lumber cut only. Value by manufacturing not included), and tourist $100,000.

Total and Per Capita Production: The total production of the county was valued at $3,489,574 and per capita production for 1927 at $836.

Assessment figures for 1927 value real estate and improvements at $9,979,600, livestock at $1,665,000 and public utilities at $2,225,716. The total assessed value of all property in the county was $15,271,990, with a taxable valuation of $4,818,878.

Tax levies are below the average. The rate for county purposes last year was only 16 mills on taxable valuations; the average school rate, 19.06 mills. The general tax for all purposes amounted to 12 cents an acre on farm and grazing lands, 42.9 a head on horses, 43.8 a head on cattle and 12.6 a head on sheep.

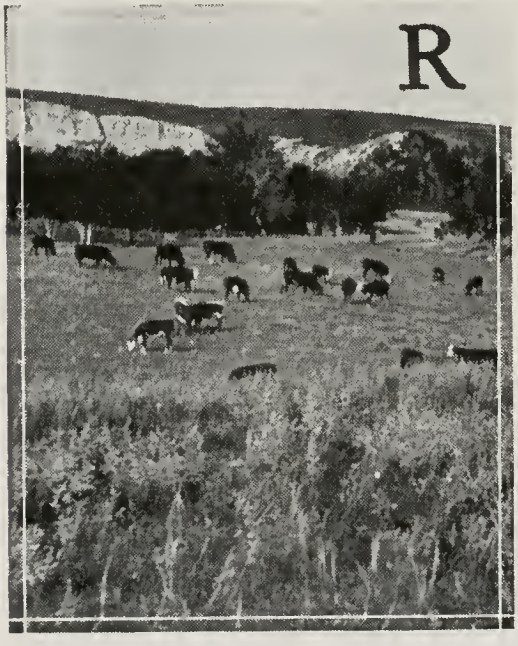
County indebtedness, net, amounted to $327,777.33 June 30, 1924. June 30, 1927, it was $257,464.86, a 21 per cent reduction. School districts made even a better showing, reducing their total net debt from $49,013.54 to $33,928.94, more than 31 per cent during the same three-year period. The per capita net debt for county and school purposes was $59.15 June 30, 1927.

Additional Information: For more detailed information about the resources of Sweet Grass county, write to County Chamber of Commerce, Big Timber, Montana.

YELLOWSTONE COUNTY

Date of Creation,	Feb. 26, 1883	Est. County Population Jan. 1, 1928	35,259
Land Area,	2,690 sq. miles	County Population 1920,	29,600
County Seat,	Billings	Population County Seat 1928,	17,500
Altitude of County Seat,	3,117 feet	Growing Season,	133 days

By Chas. H. Ruzicka



RANKING first in value of crops and livestock produced in 1927, through Billings its county seat and third largest city in the state, Yellowstone county is likewise foremost commercially and industrially in eastern Montana. Located centrally near the state's southern border, the county is bisected its entire length by the northeasterly flowing Yellowstone River, and has an average width of 40 miles southward from the pine topped Bull Mountains. Seventy-five miles of the fertile Yellowstone Valley, irrigated and in a high state of cultivation, extends through the county, flanked on both sides by productive non-irrigated benchlands. The combination of irrigated and non-irrigated lands affords exceptional opportunities for all types of farming and stockraising, as is conclusively demonstrated by the $10,000,000 annual incomes produced by its 2000 farmers. The agriculture here is highly stabilized, and the irrigated sections represent the greatest advance in diversified farming reached in Montana.

Surface and Soil: Three-fourths of Yellowstone County's land area of 1,700,000 acres is tillable, the balance practically all suitable to grazing, with broken wasteland practically nil. Approximately 150,000 acres of the valley lands along the Yellowstone River are irrigated under privately owned ditch and the U. S. Reclamation Service, comprising one of the most important and productive sections of the state. The soil here varies from sandy to heavy clay loam suitable to a large variety of crops. The non-irrigated uplands, which by far comprise the largest area of the country, have a productive soil, retentive of moisture, chiefly a chocolate silty to sandy loam. The elevation varies from about 3000 feet in the Yellowstone Valley to from 4000 to 4500 feet on the uplands.

Crops: Spring and winter wheat, sugar beets, beans and alfalfa hay are the four principal crops, each representing a value of over a million dollars each year, with corn, the other small grains, potatoes and various vegetable crops commercially important. Yellowstone county is the beet and bean center of Montana, these two crops with

alfalfa hay forming the basis of irrigated farming, however, the production of grain, corn and alfalfa and sweet clover for hay and pasture without irrigation are of large importance. Truck crops produce heavy yields of high quality, and a recent development is the establishment of a cannery for processing tomatoes, sweet corn, and pumpkins. Livestock production is an important industry, comprising 40 per cent of the county's income in hogs, sheep and wool, beef, dairying and winter feeding of mutton and beef. The latter forms an important adjunct to irrigated farming owing to the availability of sugar-beet pulp and the high quality alfalfa hay. Poultry is rapidly increasing in the county, and honey production here ranks with the leading counties of the state. The fact that this section produces successfully all the products grown in the middle West, in most cases in greater quantity per acre and higher quality, is a revelation to many visitors from other sections.

Drainage and Water Supply: The Yellowstone River affords at all times ample and dependable water for irrigation, at a relatively low cost. Drainage has been extensively provided for the irrigated lands, but in some localities has yet to be given attention. On the whole, good water is found in all parts of the county in wells at varying depths, and springs and numerous creeks also furnish a large part of the water supply. No section of the county suffers from any lack of adequate domestic water supply.

Industries: Manufacturing and distributing are important industries in Yellowstone County, represented by over 80 establishments. Beet sugar making is the chief industry, the Billings factory of the Great Western Sugar Company being the largest in the world, the 1927 product of which was valued at over $5,000,000. At Laurel, the Northern Pacific Railroad has the largest yard between the Twin Cities and Spokane, employing a large number of men in the shops and various departments. Other important industries are, mostly located in Billings, flour mills, five creameries, a cannery, a brick factory, broom factory, an artificial ice plant, three woodworking establishments, coffee roasting plants, four wholesale bakeries, two packing plants, bean and seed warehouses, etc., and a large number of wholesale and distributing houses. Billings is a large distributing center for a trade area containing 87,500 square miles, extending into northern Wyoming.

Minerals: The mineral resources of the county are not extensive, consisting of sandstone, brick clay, and coal, the latter not worked extensively, although the Bull Mountain coal field, which extends into Yellowstone from Musselshell County, is reported by the U. S. Geological Survey to be one of the largest undeveloped coal deposits in the state.

Land Values: Non-irrigated tillable lands range in price from $7.50 to $50.00 per acre, the irrigated lands ranging from $25.00 to $200.00 per acre. Grazing lands are valued from $10.00 per acre down. These prices are maintained by the value of crop returns, and particularly in the case of the irrigated lands produce incomes more commensurate than the higher priced lands of the middle West.

Transportation and Highways: Billings is an important junction point in both rail and motor transportation, the hub to a large area. It is the junction of three transcontinental lines, the Northern Pacific, Burlington and Great Northern, as well as the terminal of several branch lines, and has 28 passenger trains daily. Seven of the transcontinental automobile highways pass here including the Yellowstone Trail, National Parks Highway, Custer Battlefield Hiway, Glacier to Gulf Highway, Buffalo Highway, Beartooth Trail, and Billings-Cody Way. In addition, the county maintains a good system of roads, which are being given additional improvement made possible by the present highway laws.

Education: City and country schools in Yellowstone County are maintained on a highly developed basis, including 110 schools and one parochial school, with a total attendance of nearly 8000 pupils. Billings is the home of the new Eastern Montana Normal school, with an attendance in its first year of 200, and has the Billings Polytechnic Institute, with an enrollment of 300. In addition there are two modern schools of business.

Cities and Towns: Billings is a thoroughly modern city in every way, with the development, appearance and life of a community very much greater in size. It has 26 miles of paved streets, municipal water, sewer, street lighting and garbage disposal systems, cheap electricity and natural gas, a swimming pool, three city parks, five public playgrounds, two hospitals, a large public library, and is served by a satisfactory motor bus service. It is a city of homes, with 3750 dwellings, 50 of which were erected in 1928. It is the home of the Midland Empire Fair, which adjoins the city and is one of the finest exhibitions of the kind in the country, with an attendance of approximately 60,000 people annually. Laurel, sixteen miles west of Billings and the next town in size, has the distinction of being the location of the largest Northern Pacific railroad yard and shops between St. Paul and the Pacific Coast, and is likewise, a center for a large agricultural area. Other of the larger towns are Worden, 25 miles east of Billings, the largest town on the Huntley Irrigation Project, and Broadview, 40 miles northwest of Billings, the center and shipping point of an extensive grain producing district.

Climatological: Yellowstone County has a frost-free period of 133 days, and one of the highest average mean annual temperatures in the state, according to records covering a long period of years. This coupled with the fact that it enjoys yearly about 200 days of sunshine is conducive to maximum crop growth and development. The 14 inches of precipitation a year, about half of which opportunely falls in the growing season, particularly in April, May and June is sufficient for systematic non-irrigated farming. The snowfall is relatively light, and the winters are, with some exceptions mild, usually broken for extensive periods by warm periods precipitated by the "Chinook" winds, which mildness is a revelation to those familiar with winters further east and removed from the influence of the mountains. Altogether, the climate is healthful, not vigorous, and in the case of livestock, necessitates a minimum amount of winter shelter.

Crop Production: In 1927 Yelllowstone county was first in production of sugar beets, third in corn, fifth in potatoes and sixth in tame hay. In value of all crops the county was second with a total of $7,157,440, divided as follows: Spring wheat 66,000

acres, acre yield 22, production 1,452,00 bushels, value $1,408,440; winter wheat 48,000 acres, acre yield 25, production 1,200,000 bushels, value $1,104,000; all wheat 114,000 acres, acre yield 23.3, production 2,652,000 bushels, value $2,512,440; oats 16,000 acres, acre yield 45, production 800,000 bushels, value $352,000; barley, 5,500 acres, acre yield 36, production 198,000 bushels, value $118,800; rye 2,500 acres, acre yield 18, production 45,000 bushels, value $32,850; flaxseed 1,400 acres, acre yield 8, production 11,200 bushels, value $19,600; corn 20,000 acres, acre yield 24, production 480,000 bushels, value $345,-600; potatoes 1,400 acres, acre yield 147, production 205,800 bushels, value $133,770; beans 21,950 acres, acre yield 17.9, production 393,150, value $1,179,450; seed peas 200 acres, acre yield 20, production 4,000 bushels, value $8,400; alfalfa seed 500 acres, acre yield, 3.0, production 1,500 bushels, value $19,500; clover seed 900 acres, acre yield 7.7, production 6,920 bushels, value $103,800; all tame hay 40,000 acres, acre yield 2.4, production 96,000 tons, value $806,400; wild hay 4,000 acres, acre yield 1.1, production 4,400 tons, value $33,000; apples 3,100 bushels, value $4,030; truck crops and vegetables, $47,-200; miscellaneous fruits $700; sugar beets 14,000 acres, acre yield 12.1, production 169,-400 tons, value $1,439,900.

Livestock: Livestock products marketed in 1927 were valued at $3,034,000, giving the county second place. In combined crops and livestock Yellowstone county placed first with a total of $10,191.440.

Value of Industries: The estimated value of manufacturing was $5,185,000, giving Yellowstone fifth place in the state. In the value of tourist trade the county was third with a total of $584,000.

Total and Per Capita Production: In total production Yellowstone county was third with a value of $15,960,440 and per capita production for 1927 was $453.

In 1927, real estate and improvements were valued at $44,306,000 for assessment purposes. Livestock was valued at $1,500,000 and public utilities at $9,034,000. The total value of all property was $67,479,292, with a taxable value of $20,818,449.

The county tax rate of 13.5 mills on taxable valuations last year was the second lowest in the state. The average school rate was 27.02 mills. Farm and grazing lands carried a tax for all general purposes of 19.8 cents an acre, horses 53 6 cents a head, cattle, 54.2 cents a head and sheep 13.5 cents.

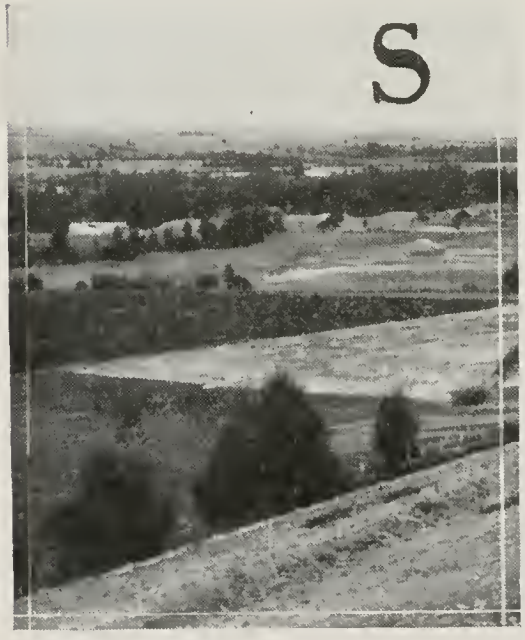
The net debt of the county was reduced from $736,500.56 to $492,863.65, more than 33 percent, during the three years ending June 30, 1927. District schools decreased their net indebtedness from $836,850.30 to $755,252.59, nearly 10 per cent, during the same period. The per capita net debt for county and school purposes, based on the 1920 census, was $42.16, well below the state average June 30, 1927.

Additional Information: For more detailed information about the resources of Yellowstone County, write to the County Agent, or the Secretary of the Commercial Club, Billings, Montana.

STILLWATER COUNTY

Date of Creation,	March 24, 1913	Est. County Population Jan. 1, 1928,	6,761
Land Area,	1,773 sq. miles	County Population 1920,	7,630
County Seat,	Columbus	Population County Seat,	897
Altitude County Seat,	3,698 feet	Growing Season	122 days

By W. H. Jones



STILLWATER County lies in the south central part of Montana. The county is about eighty miles in length from the northeast to the southwest and is about forty-five miles in width. The Yellowstone river crosses it from the west to the east about midway of its length. High mountains rise in the south end of the county. The scenery in these mountains cannot be surpassed. There is big game hunting and all streams afford excellent trout fishing. The average altitude is somewhere around 3800 feet but varies from 3410 in the eastern part of the county to over twelve thousand feet on top of Mount Wood, the second highest named peak in the state. The Lake basin region covers about half of the northern section of the county. This is a good grain raising section and recently oil has been discovered. In this basin are a number of lakes where hunters find sport in duck and goose shooting each year. Historic and scenic attractions found in the county include the Bridger Trail, Lewis and Clark Trail, Mystic and Woodbine falls, East and West Rosebud lakes, Mt. Shepart, Cathedral Peak, Stillwater Palisades, Grasshopper glacier and a host of others.

Surface and Soil: The Lake Basin territory and the Yellowstone and Stillwater valleys include practically all of the level-land in the county. The extreme north end of the county, west central and southeastern portions are rolling and quite broken. A good percentage of this land is too rough for farming and is used for grazing purposes. The soil types in the county vary from a clay loam to a sandy loam.

Crops: Wheat is the big cash crop; both winter and spring varieties are grown. Corn is being grown on quite a large scale and also sugar beets and peas are grown under irrigation. The county has been outstanding for the past six years in winning prizes on its small grains at the various fairs. At the International in Chicago in 1925 the county won first and sweepstakes on wheat besides several other important prizes. Alfalfa is one of the chief feed crops. Considerable livestock is raised in the county. In the mountains excellent summer pasture is found. The sheep and hog industry has been growing very rapidly for the past four years. It is expected that in 1928 the county will ship one million pounds of wool. Some dozen carloads of fat lambs and hogs were shipped from the county this year for the first time. The poultry industry has made rapid growth. More than a hundred thousand pounds of number one grade turkeys are shipped from the county each year.

Drainage and Water Supply: In the Yellowstone and Stillwater valleys there is an ever ready supply of water for irrigation purposes. The land is all well drained, the direction of all drainage being toward the center of the county or the Yellowstone valley. All towns in the county are well supplied with excellent water secured from the different springs, wells and streams.

Industries: There are three flour mills in the county, at Park City, Columbus and Fishtail. An excellent grade and quality of flour is manufactured from the high protein wheat raised in the county. On the West Rosebud River in the south end of the county, at Mystic lake, the Montana Power company has a hydro-electric plant with an initial development of 15,000 horsepower. This plant is operated under a head of 700 feet fall which is greater than any found at any plant in Montana, Idaho, Oregon or Washington. At the extreme east of the county in the Lake Basin Country large flows of natural gas have been discovered while drilling for oil. This gas is used in the manufacture of carbon black. A plant has been built by eastern interests for manufacturing this product.

Mineral Resources: Coal is the only mineral that the county produces in commercial quantities at present. However, there is a deposit of chromite which extends across the southern end of Stillwater County for a distance of twenty-seven miles. This is reported to be the largest deposit of chromite in the United States. Steps have been taken toward development of the large body of ore in the last year. In the south end of the county are found deposits of other minerals, such as iron, lead, copper, silver and gold. There are big quantities of different stones in the county suitable for building purposes. Quantities of the sandstone have been quarried and used in the different cities over the state for building purposes.

Timber: In the south end of the county is the Beartooth National Forest Reserve, covering 86,561 acres, which contains millions of feet of pine and fir timber.

Land Values: The agricultural land in Stillwater county varies in value from $10 per acre for grazing land to $150 per acre for the best irrigated land.

Transportation and Highways: The main line of the Northern Pacific Railway follows the Yellowstone river through the middle of the county. A branch of this railroad running into the Lake Basin territory terminates at Rapelje. The Yellowstone Trail follows the Yellowstone river on the north side through the county. There are approximately 1,200 miles of roads in the county. One of the best roads is the one leading up the Stillwater and West Rosebud valleys terminating at the Montana Power Plant at Mystic lake. The Buffalo trail crosses the northern section of the county. Some interest is being shown in hard surfacing some of the main traveled roads and much of this work has already been done. There is also some talk of a railroad tapping the rich agricultural and mineral resources in the south end of the county and terminating at the old historic mining town of Cooke City.

Education: Stillwater county is second to none in having good rural and high schools. There are five high schools with a teaching staff of 17 and a total enrollment of 238 pupils. There are 69 rural and grade schools in the county with a teaching staff of 91 and a total enrollment of 1456 pupils.

Cities and Towns: Columbus, at the junction of the Stillwater and Yellowstone rivers, is the chief town, the largest trading center and the county seat. Park City and Reed Point are towns on the main line of the Northern Pacific while Molt, Wheat Basin, and Rapelje are towns on the Lake Basin branch of this road. Absarokee and Fishtail are inland towns in the southern part of the county.

Climatological: Busteed—Elevation 4050 feet. Average date of last killing frost in the spring May 25th; average date first killing frost in fall September 23rd.

Crop Production: The value of all crops in 1927 was $3,641,380, divided as follows: Spring wheat 75,000 acres, acre yield 21, production 1,575,000 bushels, value $1,527,750; winter wheat 35,000 acres, acre yield 23, production 805,000, value $740,600; all wheat, 110,000 acres, acre yield 21.6, production 2,380,000 bushels, value $2,268,350; oats 13,000 acres, acre yield 38, production 494,000 bushels, value $217,360; barley 6,500 acres, acre yield 38, production 247,000 bushels, value $148,200; rye, 1,200 acres, acre yield 20, production 24,000 bushels, value $17,520; flaxseed 400 acres, acre yield 11, production 4,400 bushels, value $7,700; corn, 7,000 acres, acre yield 20, production 140,000 bushels, value $100,800; potatoes 700 acres, acre yield 135, production 94,500 bushels, value $61,425; beans, 400 acres, acre yield 25, production 10,000 bushels, value $30,000; seed peas, 100 acres, acre yield 30, production 3,000 bushels, value $6,300; alfalfa seed 150 acres, acre yield 5.0, production 750 bushels, value $9,750; clover seed 800 acres, acre yield 6.0, production 4,800 bushels, value $72.000; all tame hay 33,000 acres, acre yield 1.8, production 59,400 tons, value $498,960; wild hay 4,000 acres, acre yield 1.3, production 5,200 tons, value $39,000; apples $2,015; truck crops and vegetables, $6,700; miscellaneous fruits $600. Stillwater county placed fifth in sugar beet production with 1,400 acres, acre yield 13.0, production 18,200 tons, value $154,700.

Livestock: Livestock products marketed in 1927 totaled $1,309,300. Combined crops and livestock are valued at $4,680,680.

Value of Industries: The estimated value of manufacturing was $86,000. Stillwater took third place in production of petroleum with a total of $50,662, and the tourist trade was valued at $130,000.

Total and Per Capita Production: The total production for the county is valued at $4,947,342 and per capita production for 1927 at $732.

Stillwater's assessed valuation in 1927 was $15,997,159, with real estate and improvements valued at $10,488,000, livestock at $1,134,700, public utilities at $2,609,500 and net proceeds of oil wells at $94,943. The taxable value of all property in the county was $5,068,157.

The tax for county purposes last year was 33 mills on taxable valuations and the aveage levy for school purposes was 27.1 mills. The tax for all general purposes averaged 14.5 cents on farm and grazing lands, 61.1 cents a head on horses, 67.2 cents a head on cattle and 19.8 cents a head on sheep.

The county's net debt of $696,081.76 June 30, 1924, has been rapidly whittled down since that date. During the three years ending June 30, 1927, it was reduced $255,976, or nearly 30 percent.

District schools, during the same period, reduced net indebtedness from $258,063.48 to $221,751.91.

The per capita net debt for county and school purposes dropped from $125.05 in 1924 to $86.74 in 1927, a percentage of reduction exceeded by few counties.

There is a county agent located at Columbus.

Additional Information: For more detailed information about the resources of Stillwater county, write to the secretary of the Stillwater Club, Columbus, Montana.

PARK COUNTY

Date of Creation,.....Feb. 23, 1887	Est. County Population Jan. 1, 1928..11,102
Land Area,.....2,675 sq. miles	County Population, 1920,.....11,345
County Seat,.....Livingston	Population County Seat,..... 7,100
Altitude of County Seat,.....4,490 feet	Growing Season,.....78 to 125 days

By D. P. Bates

LOCATED in the south central part of Montana, Park County is 104 miles north and south and 30 miles east and west. Its southern boundary is the northern boundary of Yellowstone National Park, access to the northern entrance being through this county. Two large fertile valleys are in the county, the Yellowstone Valley, which varies from 10 to 20 miles in width, and the Shields Valley, which varies from 15 to 18 miles in width. About 82,000 acres of the land contained in these two valleys is under irrigation.

Surface and Soil: The soil of the county is for the most part a rich black loam with a clay sub-soil. Approximately two-thirds of the area of the county is within the Absaroka, Gallatin and Beartooth National Forests.

Crops: The principal agricultural crops are hard winter and spring wheat, oats, rye, barley, peas, alfalfa, timothy, and clover. All of the grains and grasses produced in the county are of proven unexcelled quality.

Drainage and Water Supply: The Yellowstone and Shields Rivers together with their many tributaries form the county's source of water supply for irrigated lands. Cold water springs are found on almost all land sub-divisions and wells are seldom greater than 40 feet deep.

Industries: Agriculture, dairying, beef cattle, sheep, cheese-making, and mining are the chief industries. Livingston is a railroad division point and has large machine shops, as well as general division and accounting offices. The largest industrial activity is found in the railroad shops at Livingston. Located in the county are a flour mill, two granite cutting yards, a cigar factory, two creameries. A large cheese factory operates near Wilsall. The products of a truck farm near Livingston are in demand on the fancy markets of St. Paul and Seattle. The Enterprise, a daily paper at Livingston, has the second largest payroll in the city.

Mineral Resources: Park County is one of the most highly mineralized regions in the state producing gold, silver, lead, coal, arsenic, tungsten and brick clay. It also has gypsum, gems, molybdenum and a variety of building and monumental stones. The Cooke City district, in the southeastern corner, is considered one of the most promising mining districts in the state, but its inaccessibility has retarded its development.

Transportation and Highways: Park County has excellent transportation facilities. The main line of the Northern Pacific goes east and west through the middle of the county, and at Livingston, in the geographical center of the county, a branch runs north up the Shields Valley to Wilsall and another south up the Yellowstone to the Yellowstone Park. A main east and west highway crosses the county and the western Park to Park route from Gardiner to Glacier Station traverses the county north and south.

Education: Besides a modern high school and four large grade schools in Livingston, there is a high school at Wilsall, another at Clyde Park, and 65 common schools in the rural districts. There is also a Catholic parochial school at Livingston.

Land Values: Improved irrigated land sells for from $75 to $100 per acre; Improved non-irrigated land at from $25 to $50, and grazing land at from $5 to $15.

Cities and Towns: Livingston, the county seat, is a modern city and one of the more important cities in the State, and is generally recognized as the tourist center of the State; other towns are Wilsall, Clyde Park, Emigrant, and Gardiner.

Climatological: According to the weather bureau station at Livingston, the average temperature is 45.5 degrees and the average annual precipitation is 14.87 inches. Observations of 20 years record a frost-free period of 121 days.

Crop Production: The total value of all crops in Park county in 1927 was $1,916,810, the county taking fourth place in a tie with Carbon county in the production of tame hay. The crops are divided as follows: Spring wheat 21,000 acres, acre yield 26, production 546,000 bushels, value $529,620; winter wheat 2,000 acres, acre yield 25, production 50,000 bushels, value $46,000; all wheat 23,000 acres, acre yield 25.9, production 596 bushels, value $575,620; oats 7,000 acres, acre yield 60, production 420,000 bushels, value $184,800; barley 6,500 acres, acre yield 34, production 221,000 bushels, value $132,600; rye 300 acres, acre yield 20, production 6,000 bushels, value $4,380; potatoes 800 acres, acre yield 150, production 120,000 bushels, value $78,000; seed peas 725 acres, acre yield 19, production 13,800 bushels, value $28,980; all tame hay 45,000 acres, acre yield 2.3, production 103,500 tons, value $869,400; wild hay 4,000 acres, acre yield 1.2, production 4,800 tons, value $36,000; apple production 2,100 bushels, value $2,730; truck crops and vegetables, $3,200; miscellaneous fruits $1,100.

Livestock: Total livestock products marketed in 1927 were valued at $1,412,500. Combined crops and livestock totaled $3,295,310.

Value of Industries: The estimated value of manufacturing in 1927 was $1,491,000. The value of metal mining was $35,000; lumbering $144,150 (includes value of timber cut only. Value added by manufacturing not included), and tourist $633,000, giving Park county second place.

Total and Per Capita Production: The total production of the county is valued at $5,632,460 and per capita production for 1927 at $512.

The assessed value of all property in 1927 was $30,843,038, with real estate and improvements valued at $21,027,000, livestock at $1,386,000 and public utilities at $4,617,000. The total taxable value was $9,623,117. The county tax rate was 18 mills on the taxable valuation and the average school rate was 21.48 mills. Taxes on farm and grazing lands averaged 17.7 cents an acre, on horses 45.22 cents a head, on cattle 48.31 cents a head and on sheep 14.1 cents a head.

The net indebtedness of the county was reduced from $393,316.44 to $327,836.68 during the three-year period ending June 30, 1927. The net indebtedness of school districts dropped from $98,176.48 to $70,408.79 during the same time. The per capita net debt for county and school purposes June 30, 1927, was $35.14, much lower than the average throughout the state.

Additional Information: For more detailed information about the resources of Park county, write to the secretary of the Commercial Club at Livingston, or the Community Club, Wilsall, Montana.

GALLATIN COUNTY

Date of Creation	Feb. 2, 1865	Est. County Population Jan. 1, 1928	17,849
Land Area	2,532 square miles	County Population 1920	15,864
County Seat	Bozeman	Population County Seat	6,183
Altitude County Seat	4,771 feet	Growing Season	78 to 105 days

By R. E. Bodley.

FEW agricultural districts in the country are so fortunately located or so favored by Nature as is the Gallatin Valley. Located on the headwaters of the Missouri River in southern Montana, at the northwest corner of the Yellowstone National Park, Gallatin county has within its borders more than half a million acres of some of the most fertile farming land in the State. The famous Gallatin Valley, nestling between several ranges of snow-clad, timbered mountains, containing literally thousands of sparkling streams of clear, cold water, has frequently been referred to by outsiders as a "dimple on the face of Nature."

Surface and Soil: Between one-third and one-half of the county is contained within the Gallatin National Forest. This portion is, of course, mountainous, and contains heavily timbered areas, interspersed with natural parks which provide an abundance of summer grazing for local livestock. The farming land in the valley proper is level. The bottom lands are rich, black alluvial soil, ranging in depth from two to forty feet. The benches and foothills are level to rolling, with a yellowish gray loam of volcanic origin, which is still deeper and more inexhaustible than the soil of the bottoms.

Crops: Spring wheat, winter wheat, oats, barley, seed and canning peas, and alfalfa hay are the principal crops. All grains are raised successfully, and root crops cannot be excelled. Gallatin county contains the second largest seed pea producing area in the United States. It raises sufficient canning peas for the largest pea canning factory

in the state; beans are also being raised extensively for the canning factory. Five hundred and fifty acres of sugar beets have been planted this spring.

Drainage and Water Supply: The valley lands are irrigated from the water of the West Gallatin River and its tributaries. The Missouri River finds its source in Gallatin county at the confluence of the Jefferson, Madison and Gallatin Rivers, near Three Forks. Water for domestic purposes in towns of the county is obtained from mountain streams, and is exceptionally pure and cold.

Industries: Gallatin county has 17 grain elevators, three flour mills, one cereal mill, Portland cement factory, four creameries, three cheese factories, daily newspaper, canning pea factory, six seed pea houses, and a commercial chick hatchery having a capacity of 47,000 eggs at one time. The raising of registered cattle, sheep, and swine, as well as cattle raising for slaughter, are other important industries. The Montana State College of Agriculture, enrolling over 1,000 students, U. S. Government Experiment Station and the U. S. Fish Hatchery are located in or near Bozeman. At Trident is located a large cement factory.

Minerals: Large deposits of coal, also lead, copper, iron, cement, and onyx are found in the county.

Timber: The Gallatin and Bridger ranges of mountains maintain a permanent supply of timber. There are several small saw milles located in the timber areas.

Land Values: Excellent irrigated land may be purchased from $60 to $200 per acre, while non-irrigated land sells for from $30 to $75 per acre, the difference in price being due to location and improvements.

Transportation and Highways: Gallatin county has over 200 miles of railroad within its borders. The Northern Pacific and Chicago, Milwaukee, St. Paul and Pacific Railways are transcontinental lines. These two railways have branch lines that traverse the principal agricultural districts of the county. At the southern terminus of the Chicago, Milwaukee, St. Paul and Pacific Railway is located the famous Gallatin Gateway Inn, for the accommodation of tourists entering the west entrance to the Yellowstone Park. The Yellowstone Trail traverses the entire length of the county, in addition to the National Park to Park Highway and the Glacier to Geysers Trail. The Gallatin Highway to the Park is gravelled from Bozeman to the boundary of the Park and is a wonderful scenic highway from Bozeman to West Yellowstone, the western entrance to Yellowstone National Park through the Gallatin Canyon.

Education: The Montana State College, enrolling approximately 1,000 students, is located in Bozeman. There are 69 schools in Gallatin county, including five high schools. Enrollment in the schools of the county is between 3,600 and 3.700 pupils.

Cities and Towns: Bozeman, the county seat, is the largest town in the county. Other towns are Three Forks, Manhattan, Belgrade, Willow Creek, Trident, and Gallatin Gateway.

Climatological: Gallatin county has a large number of days of sunshine each year. During the summer months the nights are cool. The snow fall in the mountains is very heavy, furnishing an unlimited supply of water for irrigation purposes. Rainfall records for Gallatin Valley as shown by the U. S. Government Experiment Station, have averaged between 21 and 22 inches per year.

Crop Production: In the value of all crops, Gallatin placed seventh with a total of $4,800,540. The county took second place in all tame hay, first in canning peas and third in potatoes. Production and value of the various crops are as follows: Spring wheat 52.000 acres, acre yield 25, production 1,300,000 bushels, value $1,261,000; winter wheat 41,000 acres, acre yield 28; production 1.148,000 bushels, value $1,056.160; all wheat, 93,000 acres, acre yield 26.3, production 2,448,000 bushels, value $2,317,160; oats, 13,000 acres, acre wield 60, production 780,000 bushels, value $343,200; barley 11,000 acres, acre yield 34, production 374,000 bushels, value $224,400; rye 2,500 acres, acre yield 20, production 50,000 bushels, value $36,500; flaxseed 100 acres, acre yield 10, production 1,000 bushels, value $1,750; potatoes 1,400 acres, acre yield 150, production 210,000 bushels, value $136,500; beans 200 acres, acre yield 22, production 4,400 bushels, value $13,200; seed peas 5,700 acres, acre yield 20, production 114 000 bushels, value $239,400; canning peas 160,550 cases, value $401,375; clover seed 300 acres, acre yield 6, production 1,800 bushels, value $27,000; all tame hay 49,000 acres, acre yield 2.5, production 122,500 tons, value $1,029,000; wild hay 1,000 acres, acre yield 1, production 1,300 tons, value $9,750; apples 850 bushels, value $1,105; truck crops and vegetables $19,600; miscellaneous fruits $600.

Livestock: Livestock products marketed in 1927 totaled $1,374,300 giving Gallatin county seventh place. In combined crops and livestock the county placed ninth with a total value of $6,174,840.

Value of Industries: In 1927 the county placed tenth in estimated value of manufacturing which totaled $1,720,000. The value of metal mining as $300,000 giving the county fifth place, lumbering totaled $167,400 (includes value of lumber cut only. Value added by manufacturing not included) and tourist $463,000.

Total and Per Capita Production: In total production the county placed eighth with a value of $8,825,240, and per capita production in 1927 was $494.

The value of all property in the county totaled $43,833.312 for assesment purposes in 1927. Real estate and improvements were assessed at $28,624,800, livestock at $1,427,900 and public utilities at $8,827,700. The taxable value of all property was $13,917,260.

The tax rate for county purposes last year was 19.5 mills, considerably below the state average, on taxable valuations. The school levy was 25.71 mills. The tax for all general purposes was 25 cents an acre on farm and grazing lands, 50.7 cents a head on horses, 60 cents a head on cattle and 16.6 cents a head on sheep.

The county net debt dropped from $624,096.67 to $509,504.21 during the three years ending June 30, 1927, and the total net indebtedness of school districts was reduced from $449,619.43 to $34,711.71. The per capita net debt for county and school purposes June 30, 1927, was $53.90, slightly below the average for the state.

The county agent is located at Bozeman.

Additional Information: For more detailed information about the resources of Gallatin County, write to Manager of Bozeman Chamber of Commerce, Bozeman; Chamber of Commerce, Three Forks, Manhattan, or Belgrade; or to County Extension Agent, Bozeman.

CARBON COUNTY

Date of Creation,	March 4, 1895	Est. County Population Jan. 1, 1928	14,032
Land Area,	2,069 sq. miles	Population County 1920,	15,279
County Seat,	Red Lodge	Population County Seat 1920,	4,515
Altitude County Seat,	5,650 feet	Growing Season,	Apr. 1 to Sept 15

By O. H. P. Shelley

IN VALUE of coal production Carbon County leads the state. Situated in south central Montana, the Yellowstone River marking its northern boundary, Carbon County rises from an approximate elevation of 3,300 feet to more than 13,000 feet in the Beartooth mountains near the Wyoming boundary. Granite peak, the highest named mountain in the state, with an elevation of 12,850 feet, is in this county, and there are several unnamed peaks in the same range that are above 13,000 feet, according to the United States Geological Survey. The scenic resources of the county are being utilized to a greater extent each year and the Beartooth National Forest is rapidly becoming a playground for eastern Montana.

Surface and Soil: The southern part of the county is mountainous and is largely given over to stock raising. The valleys running north and south, widen out in the northern part of the county and the mountains give way to rolling bench lands. The soil in the valleys is a deep alluvial loam; on the bench lands a sandy loam, in the eastern portion a sandy loam and clay.

Crops: Sugar beet raising is extensively followed in the northeastern part of the county. Other crops are corn, alfalfa, timothy, wheat, oats, rye, barley, flax, vegetables of all kinds, watermelons, canteloupes, seed peas, canning peas, small fruits, bees and honey, and various kinds of seeds.

Drainage and Water Supply: Carbon is one of the best watered counties in the state, numerous streams rising from the glaciers and snow packed drifts in the Beartooth mountains. The principal streams are the Clark's Fork, Rock creek, Willow creek and Red Lodge creek. Water is found in wells at depths ranging from 10 to 30 feet.

Industries: Aside from agriculture and stock raising, coal mining is the chief industry. Bituminous coal is mined at Red Lodge, Washoe and Bear Creek, where the mines are reputed to be the largest in the northwest.

Mineral Resources: Immense deposits of coal are located at the three towns named above. The first producing oil well in Montana is located at Elk Basin, near the Wyoming line. Other mineral resources include gypsum, chromite, natural gas, limestone and sandstone, and possibly pottery clay, fire clay and uranium.

Timber: About one-fourth the area of the county is included within the national forests. Lumbering operations are conducted on a small scale. The high areas within the forests are utilized as summer grazing range for many bands of sheep.

Land Values: Prices for irrigated lands range from $25 to $250 an acre, according to location. Non-irrigated land brings from $5 to $20 an acre and grazing land from $2 to $8 an acre.

Transportation and Highways: The Northern Pacific, the Chicago, Burlington and Quincy, the Montana-Wyoming and Southern Railways provide rail transportation. The county is well supplied with trunk highways and gradual extensions are being made. At the present time there are about forty miles of gravel road.

Education: There are 67 schools in the county, including seven high schools, with a total enrollment of 3,846.

Cities and Towns: Red Lodge, the county seat, is the largest and most modern town. Other towns are Bear Creek, Belfry, Bridger, Fromberg, Edgar, Silesia, Joliet, Boyd, Roberts, Luther and Roscoe.

Climatological: According to the weather bureau station at Red Lodge, the average temperature is 39.8 degrees and the average annual precipitation is 19.28 inches. Observations of 22 years record a frost-free period of 89 days.

Crop Production: The value of all crops in Carbon county totaled $3,694,581. This county placed second in the production of sugar beets and tied fourth place with Park county in tame hay production. The various crops are as follows: Spring wheat, 43,000 acres, acre yield 28, production 1,204,000 bushels, value $1,167,880; winter wheat, 9,000 acres, acre yield 23, production 207,000 bushels, value $190,440; all wheat, 52,000 acres, acre yield 27.1, production 1,411,000 bushels, value $1,358,320; oats, 10,000 acres, acre yield 42, production 420,000 bushels, value $184,800; barley 3,200 acres, acre yield 30, production 96,000 bushels, value $57,600; rye 600 acres, acre yield 17, production 10,200 bushels, value $7,446; flaxseed, 300 acres, acre yield 7, production 2,100 bushels, value $3,675; corn, 5,000 acres, acre yield 25, production 125,000 bushels, value $90,000; potatoes, 800 acres, acre yield 155, production 124,000 bushels, value $80,600; beans, 4,100 acres, acre yield 20, production 92,000 bushels, value $276,000; seed peas, 2,800 acres, acre yield 23.3, production 65,200 bushels, value $136,920; canning peas, 35,250 cases, value $88,125; alfalfa seed, 25 acres, acre yield 3.0, production 75 bushels, value $975; all tame hay, 45,000 acres, acre yield 2.3, production 103,500 tons, value $869,400; wild

hay 1,300 acres, acre yield 1.1, production 1,400 tons, value $10,500; apples 11,650 bushels, value $15,145; truck crops and vegetables, value $15,000; miscellaneous fruits, value $700; sugar beets, 4,700 acres, acre yield 12.5, production 58,750 tons, value $499.375.

Livestock; Livestock products marketed in 1927 totaled $1,034,500. Combined crops and livestock were $4,729,081.

Value of Industries: The estimated value of manufacturing was $664,000. The lumbering industry was valued at $11,160 (includes value of lumber cut only. Value added by manufacturing not included). Carbon county was second in coal mining with a value of $2,139,521, and fourth in production of petroleum with a value of $22,873. The tourist trade contributed $240,000 in wealth.

Total and Per Capita Production: The total production of the county is valued at $7,806,635, giving Carbon tenth place in the state. The per capita production for 1927 is valued at $556.

Carbon county has a home demonstration agent located at Red Lodge.

In 1927, Carbon had an assessed valuation of $22,187,508, of which $12,979,951 represented value of real estate and improvements, $1,120,992 represented value of livestock, and $4,486,246 represented value of public utilities. Net proceeds of mines totaled $576,-264, and taxable value of all other property was $7,690,524.

The tax rate for county purposes last year was 23.5 mills on taxable valuations, and the average school rate was 35.13 mills. The average general tax for all purposes was 23.6 cents an acre on farm and grazing lands, 66.2 cents a head on horses, 66.4 cents a head on cattle and 21.9 cents a head on sheep.

The county's net debt June 30, 1927, was $594,484.61, and the net indebtedness of all school districts amounted to $362,206.51. This represents a percapita net debt for county and school purposes of $62.61, based on 1920 census returns.

Additional Information: For more detailed information about the resources of Carbon county, write to the Secretary, Beartooth Boosters Club, Red Lodge, Montana.

SOUTH WESTERN MONTANA

Holds Front Rank in Mining and Stockraising—Butte the Largest City in Montana and Most Important Distributing Point—Ranches Above the Average in Size.

Through Beaverhead and Madison counties, South Western Montana takes first place in stockraising, and wild hay production, and through Silver Bow county it also leads in mining, and has the largest city and the most important distributing point in the state. Largely, perhaps, because of inadequate rail facilities, agricultural possibilities of Madison county have not received the recognition to which they seem to be entitled. Except for a part of Silver Bow county, the district lies in the slope region east of the main range of the Rocky Mountains.

While Silver Bow is the leading producer in the state, as well as one of the most important in the country, of copper, zinc, silver and arsenic, an unusually wide variety of minerals are found in Beaverhead and Madison counties, many of which are undeveloped. The combined value of the output of metal mines and quarries in the three counties comprising the district was $46,065,000 in 1927, Silver Bow ranking first among all counties of the state, Beaverhead eighth and Madison ninth.

Industrial activities center at Butte. Manufacturing enterprises of the mining city include meat packing, oil refining, production of dairy products, brick, clay and assay goods and others mentioned in detail in the discription of Silver Bow county which follows. There is considerable developed and undeveloped waterpower in the district.

The agricultural areas range in elevation from 4,000 to 5,000 feet. The upper mountain valleys are devoted to hay for winter livestock forage. Beaverhead county leads the

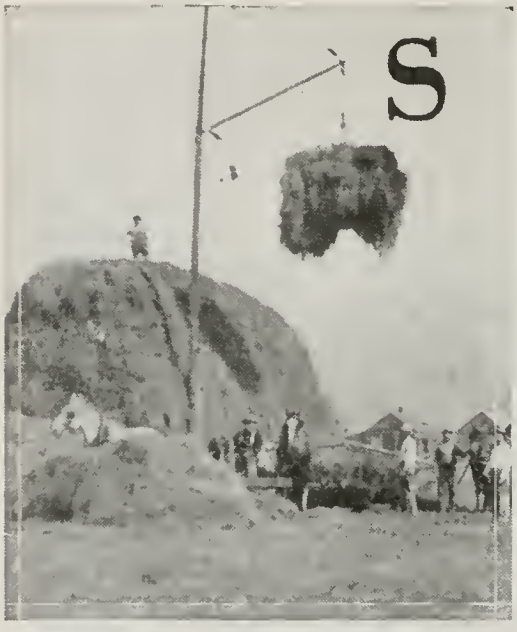
state in value of livestock sold during the past year and is also seventh in the production of tame hay. The livestock population of the district is 96,753 head, of cattle and 275,325 sheep.

Five and one-tenth per cent of all land in farms in Montana is in this district and five per cent of all crops are produced here. The district produces 27 per cent of the wild hay, eleven per cent of the alfalfa hay, eight of all tame hay, four of potatoes, six of seed peas, two of oats, and two per cent of the barley.

MADISON COUNTY

Date of Creation	Feb. 2, 1865	Est. County Population Jan. 1, 1928	6,058
Land Area	2,590 square miles	Population 1920	7,485
County Seat	Virginia City	Population of County Seat	400
Altitude of County Seat	5,760 feet	Growing Season	125-130 days

By George E. Gohn.



SURROUNDED and divided by mountain ranges from 8,000 to 11,000 feet high, Madison county is composed of two parallel valleys, the Madison and the Ruby. The valley floors are from 4,000 to 6,000 feet elevation. Due to the large amount of grazing lands composed of forest reserves and open land, livestock production is the largest industry. The valleys are irrigated and produce unusually high yields of hay, grain, potatoes, and other vegetables. Dairying and poultry raising are successful.

Surface and Soil: The soils of the valleys range from a heavy clay to a sandy loam with some gravelly streaks. Most of it is well adapted to agriculture, though some is in need of drainage. The bench lands bordering the valley floors are composed of a clay loam shot with gravel or coarse sand. This type of soil is excellent where water is obtainable for irrigation.

Crops: The principal crops are alfalfa hay, oats, wheat, barley, potatoes, and vegetables. Seed peas are an important crop in the Ruby Valley, which has proved one of the best producing sections in the state. The valley also grows premium quality oats and wheat.

Drainage and Water Supply: Irrigation water comes from the Madison, Beaverhead, Big Hole and Jefferson Rivers, besides numerous large mountain streams. All ditches are owned by farmers with no government developed projects. There is an abundance of water and an excellent opportunity exists for government projects as the need becomes apparent.

Industries: Other industries in addition to agriculture consist of mining and, to a small degree, lumbering. The Montana Power Company has one of its largest power plants on the Madison River, near McAllister.

Minerals: Mining resources are large and as yet in their infancy. Numerous small mines are being operated and some are developing into plants employing 40 men, while every gulch seems to contain mineral claims, awaiting more favorable conditions for development.

Timber: Timber areas are located mostly in the Madison National Forest reserve Some excellent timber for milling purposes is found here.

Land Values: The price of land ranges from $5 an acre for grazing land to $150 an acre for some of the small diversified farms under irrigation. Generally speaking, land values are low compared to other sections in the Northwest.

Transportation and Highways: The Northern Pacific Railroad runs a branch line up each of the two valleys from their main line at Whitehall. The Yellowstone Trail runs acress the northern end of the county and the Vigilante Trail runs from Butte through the county lengthwise to Yellowstone Park. Roads generally in the county are above average and are passable the year around.

Education: Nine high schools as follows: Virginia City, Sheridan, Twin Bridges, Ennis, Norris, Pony, Harrison and Whitehall and Cardwell which are joint with Madison and Jefferson counties. The number of school districts are 55 and there are 1710 pupils enrolled this year. The State Orphans' Home is located at Twin Bridges.

Transportation: In addition to the railroads there are two auto stage lines, one from Ennis to Butte via Sheridan and Twin Bridges and the other from Dillon to Whitehall via Twin Bridges.

Recreation: Madison county is an ideal locality for hunters and fishermen, the Madison River being the best fishing stream in the northwest. In this stream there abounds a great variety of fish, the rainbow, native steelhead, lochleven, and dolly varden trout, besides here and there an eastern brook trout and some Montana grayling. This river heads in the Yellowstone National Park, flows through the entire length of the Madison Valley, passing through the Lower Madison Reservoir, before it enters the Lower Madison Canyon. On the west shore of this reservoir is located a government fish hatchery, which does excellent work in keeping the lakes and streams of Madison county well stocked with all varieties of fish.

There are to be found in the Madison Range, from the lower end to the south end, which terminates in the National Park, deer, elk, mountain sheep, bear and small game, one can go in to this range at Jack Creek and come out at the upper Madison Canyon, and be during this time in one of the best hunting countries in Montana. There are trails in this region that can be gotten over horseback, and there are parts of this country after a snow in the fall that show more game sign than any hunter should ask for.

The Gravelley Range has elk, deer, mountain sheep and bear and farther south you run into the upper and lower Red Rock Lakes, where ideal waterfowl shooting is to be had. Deer are on the increase and other game appears to be increasing.

If you will come to Madison county and swing a rifle over your back with a sling strap, and be willing to take the gaff that a hunter should take, you will not go away disappointed, for there is plenty of game waiting for you, if you are willing to do your part.

Cities and Towns: Twin Bridges and Sheridan are the largest towns in the county, having a population of approximately 650 each. The State Orphans' Home is located at Twin Bridges. Other towns are Virginia City, the county seat, Cameron, Ennis, Jeffers, McAllister, Pony, Harrison, and Jefferson Island, all of which, with the exception of Virginia City, are located in the Madison Valley. In the Ruby Valley, in addition to Virginia City, are Waterloo, Silver Star, Twin Bridges, Sheridan, Laurin, and Alder.

Climatological: The climate is very equable with a large per cent of sunshiny days. Snow seldom covers the valley floors more than four inches deep and often there is none, while the mountains receive and hold heavy snow falls which supply water for irrigation. Precipitation is around 11 inches during the year in the valleys, most of it coming during the growing season.

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Crop Production: In the production of tame hay Madison county placed tenth. Total production of all crops is valued at $1,583,322, divided as follows: Spring wheat 9,000 acres, acre yield 28, production 252,000 bushels, value $244,440; winter wheat 5,000 acres, acre yield 20, production 100,000 bushels, value $92,000; all wheat 14,000 acres, acre yield 25.1, production 352,000 bushels, value $336,440; oats 7,000 acres, acre yield 41, production 287,000 bushels, value $126,280; barley 2,200 acres, acre yield 48, production 105,600 bushels, value $63,360; rye 1,300 acres, acre yield 28, production 36,400 bushels, value $26,572; flaxseed 100 acres, acre yield 12, production 1,200 bushels, value $2,100; corn 1,000 acres, acre yield 22, production 22,000 bushels, value $15,840; potatoes 900 acres, acre yield 120, production 108,000 bushels, value $70,200; seed peas 200 acres, acre yield 19, production 3,800 bushels, value $7,980; alfalfa seed 25 acres, acre yield 2.4, production 60 bushels, value $780; all tame hay 50,000 acres, acre yield 1.7, production 85,000 tons, value $714,000; wild hay 28,400 acres, acre yield 1.0, production 28,400 tons, value $213,000; apples $1,170; truck crops and vegetables $4,500; miscellaneous fruits $1,100.

Livestock: The value of livestock products marketed in 1927 totaled $1,255,400. Combined crops and livestock were valued at $2,838,722.

Value of Industries: The estimated value of manufacturing was $74,000. Madison county placed ninth in metal mining with a value of $125,000. Lumbering totaled $70,680 (includes value of lumber cut only; value added by manufacture not included), and tourist $150,000.

Total and Per Capita Production: The total production for the county is valued at $3,258,402 and per capita for 1927 at $538.

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The assessed valuation of all property in the county in 1927 was $17,768,727. Real estate and improvements were valued at $11,190,000, livestock at $2,240,195 and public utilities at $2,665,196. The total taxable valuation was $5,695,237.

The tax rate for county purposes last year was 20.67 mills on the taxable valuation, somewhat lower than the average throughout the state. The average levy for school purposes was 25.39 mills. Taxes for all general purposes averaged 12.4 cents an acre on farm and grazing lands, 40.1 cents a head on horses, 51.3 cents a head on cattle and 15.1 cents a head on sheep.

Madison's net debt was reduced from $132,697.05 in 1924 to $105,988.80 June 30, 1927. During the same three-year period, net indebtedness of school districts decreased slightly, such debt totaling $134,668.60 June 30, 1927, as compared with $140,137.47 in 1924. The per capita net debt for county and school purposes June 30, 1927, was $32.10, little more than half the average throughout the state.

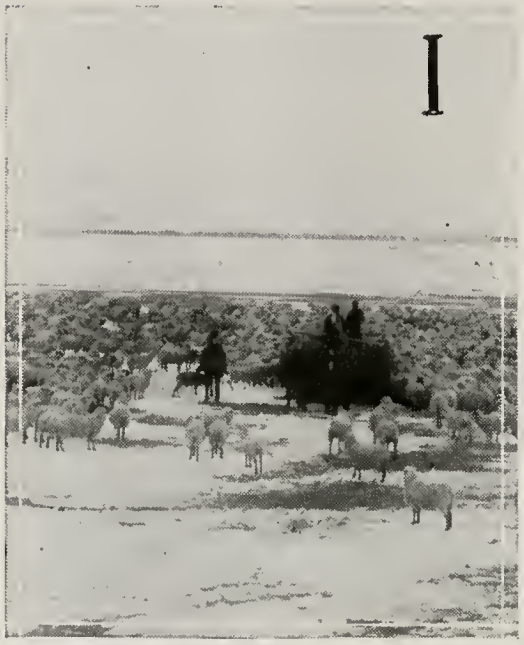
The county agent is located at Twin Bridges, Montana.

Additional Information: For more detailed information about the resources of Madison county, write to Secretary of Commercial Club, Twin Bridges, or George E. Gohn, County Clerk, Virginia City, or Secretary, Sheridan Business Men's Club, Sheridan, Montana.

BEAVERHEAD COUNTY

Date of Creation.....Feb. 2, 1865	Est. County Population Jan. 1, 1928....5,061
Land Area.....5,619 square miles	County Population 1920.....7,246
County Seat .....Dillon	Population of County Seat.....2,701
Altitude of County Seat.....5,089 feet	Growing Season.....May to September

By Frank Hazelbaker.



IN the extreme southwestern corner of the state is Beaverhead, Montana's birthplace and its largest county. Its name is derived from Beaverhead Rock, named by the Lewis and Clark expedition which traversed the county. Bannack, scene of the state's first great gold discoveries and Montana's first territorial capital, is located here, and the county abounds with spots of historical interest. Nature has lavishly bestowed its beauties upon Beaverhead county and it is a scenic paradise. The section is noted for its hunting and fishing. Elkhorn Springs, a popular summer resort, is located at the head of Grasshopper Creek. The principal valleys, each of them a wealthy agricultural district, are the Beaverhead, Big Hole, Centennial, Grasshopper, Horse Prairie, and Medicine Lodge. The county has no bonded indebtedness.

Surface and Soil: The county is bordered on three sides by continental divides, which slope down to wide benchlands and broad valleys. The soil is considered the most productive in the state, being formed largely from the erosion of old shale beds and enriched by the natural process of vegetation.

Crops: Oats and hay form the principal crops, with the acreage of wheat rapidly increasing. Timothy and alfalfa thrive and more wild hay, of exceptional quality, is produced here than in all other counties of the state together. Wheat and barley are the principal crops on the bench lands. Peas and field beans are raised in some quantities, and potatoes and other vegetables have netted farmers good returns.

Drainage and Water Supply: The principal streams are the Beaverhead and Big Hole rivers, and these have countless tributaries, fed by thousands of springs and the mountain snows. The streams of the county form an abundant and never-failing water supply. The Beaverhead drainage supports about 125,000 acres of farm land, and the Big Hole 100,000 acres of hay lands. The Lima reservoir supplies 120,000 acre feet to ranches of the Beaverhead valley, but in most sections the ranchers depend entirely upon the natural flow of the streams for their water. The total irrigable area is well over 250,000 acres.

Industries: Stock raising, farming, dairying, mining, lumbering, meat packing and milling are among the important industries. Beaverhead stands first among Montana's counties in both sheep and cattle raising, and Dillon is Montana's largest wool shipping point. Thousands of head of cattle are fed each winter in the county's valleys, including the Big Hole Basin, which produces hay-fed cattle that compete successfully with the corn-fed stock of the middle west.

Mineral Resources: Operations are being resumed in several historic mining camps of the county. Mines in the Elkhorn district produce high-grade copper ore, and Argenta produces lead and silver ore. Silver and gold are found in the vicinity of Bannack. Rich oil prospects exist and an oil shale plant is being planned. Iron, prosphate and graphite are other minerals found.

Timber: The timbered area includes about 1,240,000 acres, species being lodgepole pine, douglas fir, engelmann spruce, lumber pine, balsam fir, aspen and cottonwood. The Beaverhead National Forest is the second largest in the state. Railroad ties are the principal export.

Land Values: Land values have never been inflated and it is questionable if there is any place where one could secure greater land values for his money than in this county.

Transportation and Highways: There are approximately 2,000 miles of roads in the county, of which 300 miles are main through highways. Most of the roads are of good natural composition and open for traffic throughout the year. Ten miles of hard surface highway was constructed under state and federal supervision on the Butte-Dillon road, and other extensive projects are planned. The main highways are maintained under the "seven per cent" system. All large streams are spanned by steel bridges.

Education: Dillon is the seat of the Montana State Normal College, with an annual enrollment of 700 students. Its educational system, including two public schools and the county high school, is noted for its efficiency. There are 39 rural schools in the county. The total enrollment for the county, exclusive of the college, is about 1,500.

Cities and Towns: Dillon is the county seat; Lima, a railroad center; Wisdom, an agricultural center; Armstead, a junction point, and Jackson and Dell, ranching supply centers. There are eleven other postoffice towns.

Climatological: Generally mild winters and cool, pleasant summers give the county an equable climate.

Crop Production: The value of all crops in Beaverhead county totaled $3,092,942, placing seventh in tame hay. The various crops are as follows. Spring wheat 3,000 acres, acre yield 26, production 78,000 bushels, value $75,660; winter wheat 1,000 acres, acre yield 29, production 29,000 bushels, value $26,680; all wheat 4,000 acres, acre yield 26.7, production 107,000 bushels, value $102,340; oats 7,000 acres, acre yield 53, production 371,000 bushels, value $163,240; barley 2,200 acres, acre yield 48, production 105,600 bushels, value $63,360; rye 600 acres, acre yield 24, production 14,400 bushels, value $10,512; potatoes 500 acres, acre yield 110, production 55,000 bushels, value $35,750; seed peas 575 acres, acre yield 21.4, production 12,300 bushels, value $25,830; all tame hay 44,000 acres, acre yield 2.1, production 92,400 tons, value $776,160; wild hay 212,600 acres, acre yield 1.2, production 255,100 tons, value $1,913,250; truck crops and vegetables $2,500.

Livestock: Beaverhead county placed first with livestock products marketed in 1927, totaling $3,429,500. The county also placed seventh with combined crops and livestock valued at $6,522,442.

Value of Industries: The estimated value of manufacturing in 1927 was $286,000. The county placed eighth in metal mining with a total value of $150,000; lumbering was $241,000 (including value of lumber cut only; value added by manufacturing not included), and tourist $180,000.

Total and Per Capita Production: The value of all products totaled $7,379,442 and the county placed second in per capita production for 1927 with a total of $1,458.

The value of livestock in 1927 was $3,774,000, according to assessment figures. Real estate, with improvements, was valued at $11,140,000, and public utilities at $4,630,000. The assessed value of all property was $22,546,771, with a taxable value of $7,176,572.

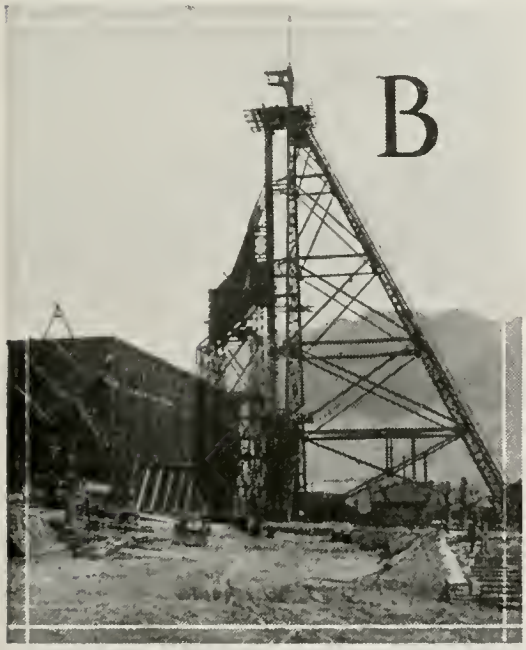
The county tax rate last year was 27.5 mills on the taxable valuation. The average school levy was 23.36 mills. The general tax for all purposes on farm and grazing land was 11.6 cents an acre, which is 2.4 cents below the state average. The average tax on horses was 34.6 cents, on cattle 58.6 cents and on sheep 18.1 cents a head.

Additional Information: For more detailed information about the resources of Beaverhead write to the State Publicity Division, Helena, Montana.

SILVER BOW COUNTY

Date of Creation	Feb. 16, 1881	Est. County Population Jan. 1, 1928	64,808
Land Area	719 square miles	County Population 1920	60,313
County Seat	Butte	Population County Seat	41,611
Altitude of County Seat	5,755 feet	Growing Season	108 days

By Frank R. Venable.



BUTTE, the world's greatest mining city, is to all intents and purposes Silver Bow county. While it was founded and grew to fame upon its mineral resources, it has developed into the largest distributing point in the State and is an important industrial center. In production of butter and packing-house products, it leads the State. The largest city between the Twin Cities on the east and Spokane on the west, and between Salt Lake City on the south and the Canadian border on the north, Butte is an odd and interesting combination of mining camp, modern metropolis, manufacturing point and well-kept residential center.

Silver Bow, the third smallest county, lies in southwestern Montana. The summit of the main range of the Rocky Mountains forms most of its eastern boundary, the Highland Mountains, Camp Creel, and the Big Hole River its southern boundary, while its irregular western and northern boundaries are formed by hills and mountains. The elevation of the county ranges from a minimum of approximately 5,000 feet above sea level to a maximum of 10,000 feet. The growing season is short and the tillable areas small factors which limit the crop production range. Agriculture is influenced by the Butte market. Truck gardening and dairying are its most important phases.

Butte takes its name from the huge isolated butte that stands sentinel-like on the western end of the town. Founded in 1864 as a placer camp, it was nearly deserted January 1, 1875, when William L. Farland re-located the Travonia quartz lode and, with nearly every blow of the pick uncovered ore so rich that it led to the development of the entire district and the building of the greatest mining camp in the world. More than 90 per cent of the total Montana mineral production normally comes from the Butte district, which contains 100 shafts with underground workings totaling 2,700 miles. When working to capacity, the mines employ 15,000 miners, who hoist 20,000 tons of ore every 24 hours. One mining company alone employs in normal times as many metal miners as the states of Colorado, Utah and New Mexico combined. The Stewart is the deepest operating mine in Butte, measuring 3,653 feet from the collar to sump. Through scientific ventilation methods, excessive under-

ground temperatures at the lower levels have been reduced as much as 10 to 15 degrees, and it is believed that when the working ore bodies reach to a depth of 5,000 feet, atmospheres that allow of safe and efficient work can be attained. Mammoth electric hoists, permitting operations at the 5,000 foot level, are now being installed.

The total value of the mineral output of Butte since its discovery is variously estimated from one and a half to two billion dollars. Copper, zinc, silver, and manganese are the chief ores, although gold, lead, arsenic, and other minerals are obtained as by-products. The normal production of copper ranges from 260,000,000 to more than 300,000,000 pounds a year; of silver approximately 12,000,000 ounces, and of zinc 175,000,000 pounds annually. The large manganese deposits are pronounced by the U. S. Geological Survey as among the most valuable reserves of this metal in the country. Gems, bismuth, antimony, cadmium, brick clay, and clay assay goods are all produced commercially.

Besides being a distributing point for a wide variety of farm and manufactured products, Butte is an important manufacturing center, and the largest consuming market in Montana. Industries include smelters, concentrators, foundries and machine shops, monumental works, bakeries, creameries, brick, clay, and assay goods, planing and saw mills, meat packing, bottling works, sporting goods, plants making macaroni, overalls, mattresses, saddles and harness, brooms and brushes, tents and awnings, metallic packing and other products.

Butte enjoys the best rail facilities of any city in the State and is strategically located to demand the trade of an interstate region. The main lines of the Northern Pacific and of the Chicago, Milwaukee, St. Paul & Pacific bring it trade from east and west; the Butte-Great Falls branch of the Great Northern brings it trade from the north, and it is the northern terminus of the Pocatello branch of the Oregon Short Line that brings trade from the south. An electrified rail system, as well as an hourly bus-line service, connects it with Anaconda. The trade from many branch lines in this district naturally gravitates to Butte. The city is also on the principal east and west highways and on two Park-to-Park highways.

The State School of Mines is located at Butte. Thoroughly equipped and with a large faculty, the school draws students from all parts of this as well as from foreign countries because of its proximity to the world's largest copper mines and mills.

For many years Butte has been one of the unique cities of the country from the sightseer's point of view. Leading the nation in electrically operated mining, milling, smelting and refining enterprises, Butte draws mining and scientific men from all over the world to study the methods used in its mines. Columbia Gardens, Butte's most popular playgrounds, are noted for varieties of flowers which require long sunny days and relatively mild sun heat during the growing season.

Educational: Number of graded schools, 30; enrollment, 6,132. Number of high schools, 2; enrollment, 1,550. Other institutions: State School of Mines, 189 students and 12 instructors.

Business Statistics: Number of railroads, 6; railway mileage, exclusive of spurs and sidetracks, 155.99; number of manufactures, 125; average number of wage-earners, 25,000; number of banks, 4; number of general stores, 9; confectionery, etc., 116; groceries and meats, 257; lumber yards, 7; total number merchants, 1,045; number of creameries, 6; number of saw mills, 2; number of attorneys, 128; number of physicians, 60

Climatological: According to the weather bureau station at Butte, the average temperature is 42.4 degrees and the average annual precipitation is 13.87 inches. Observations of 28 years record a frost-free period of 112 days.

Crop Production: The value of all crops produced in Silver Bow county is $230,973, divided as follows: Barley 2,000 acres, acre yield 50, production 100,000 bushels, value $44,000; rye 1,300 acres, acre yield 27, production 35,100 bushels, value $25,623; potatoes 300 acres, acre yield 90, production 27,000 bushels, value $17,550; all tame hay 5,000 acres, acre yield 1.9, production 9,500 tons, value $79,800; tame hay 6,700 acres, acre yield 1.1, production 7,400 tons, value $55,500; truck crops and vegetables $8,500.

Livestock: Livestock products marketed in 1927 totaled $506,600. Combined crops and live stock were $737,572.

Value of Industries: Silver Bow county placed first with a total value of all industries of $53,204,848, as follows: Manufacturing $6,091,000, giving the county fourth place; metal mining first, with a total of $45,790,000; lumbering $16,275 (includes value of lumber cut only; value added by manufacturing not included). Silver Bow placed fifth in tourist trade with a total of $570,000.

Total and Per Capita Production: The total production of the county is valued at $53,204,848 and per capita production for 1927 at $821.

Real estate and improvements were assessed in 1926 at $53,488,275. with a taxable value of $16,046,482. Public utilities were assessed at $8,632,166, with a taxable value of $3,452,866, and net proceeds of mines amounted to $9,365,617, which is both assessed and taxable value. The total assessed value of all property was $119,854,798, and the total taxable value was $37,658,165.

The tax rate for county purposes last year was 24 mills on taxable valuations, and the levy for school purposes was 19 mills. Farm and grazing lands carried a tax of 8.6 cents an acre; horses 69.8 cents a head; cattle $1.07 a head, and sheep 12.7 cents.

The net county indebtedness June 30, 1924, amounted to $1,366,310.67. June 30, 1927, it was $575,669.96, a reduction of 42 per cent. During the same period, the net indebtedness of school districts decreased from $356,764.99 to $285,865.50, nearly 20 per cent. The term "net indebtedness" means the gross debt less cash on hand and in sinking and other funds available to pay that debt. The per capita net debt for county and school purposes, based on the 1920 census, dropped from $41.41 in 1924 to $25.87 June 30, 1927, less than half the average for the state.

Additional Information: For more detailed information about the resources of Silver Bow county, write to the Butte Chamber of Commerce, Butte, Montana.

EAST CENTRAL MONTANA

Growing Season Long and Hot—Large Acreage of Corn—New Railroad Has opened Rich Farming Area—Irrigation in Yellowstone Valley.

Three decades ago the entire territory of east central Montana, including the counties of Richland, Wibaux, Dawson, Prairie, McCone and Garfield, was devoted exclusively to stock raising. Today the district is rapidly becoming known as one of the leading crop producing sections of the state. Stockgrowing is still an important wealth producer in Prairie, McCone and Garfield in the western tier of the district. With the advent of the new Redwater Valley branch of the Northern Pacific, however, facilitating the movement of crops and general farm produce, the country is being looked upon as a future grain area. At present 15 per cent of the spring wheat produced in the state is grown here.

Ten and seven-tenths of all land in farms in Montana is in this district and 14 per cent of all crops are produced here. The district produces 42 per cent of the flax, 27 of corn, 20 of oats, 18 of alfalfa seed, 15 of spring wheat, 15 of sugar beets, 13 of all wheat, 12 of dry beans, 10 of potatoes, 10 of barley, eight of rye, eight of tame hay, eight of wild hay, five of winter wheat, four of alfalfa hay, one per cent of the seed peas and one per cent of the apples.

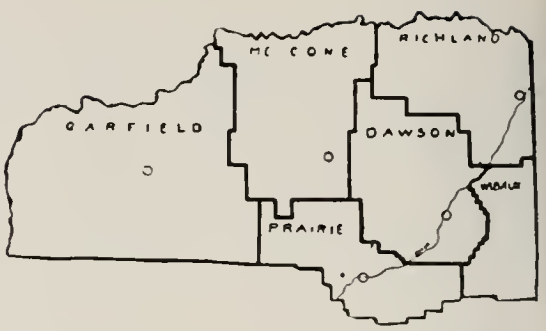
While non-irrigated farming is the dominant method there being little irrigated land outside of the Yellowstone valley in the southeastern quarter, the irrigated district of Richland county has made good progress toward the establishment of a diversified system of agriculture that includes a generous amount of livestock. Seed production here is important. Corn is one of the most profitable

crops and is most successful when planted for stocking off or used for fodder or silage. The Montana Experiment Service makes the following recommendations in regard to agriculture:

Wheat should be planted on land previously planted to corn or other intertilled crops or on summer fallowed land.

Summer tillage for non-irrigated farming is of the utmost importance.

The district is well adapted to alfalfa seed production.



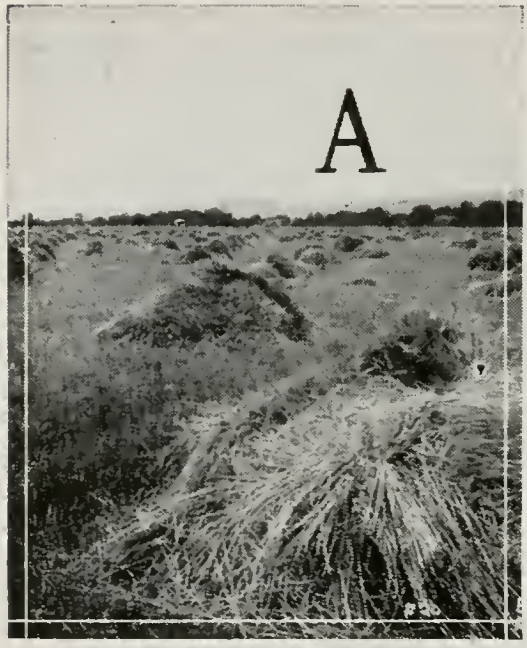
More of the available grazing land should be used.

Lignite coal abounds. Natural gas has been discovered in large quantities. (See chapter on natural Gas.) Barite, iron potash and clay deposits are reported to exist.

WIBAUX COUNTY

Date of Creation	Aug. 17, 1914	Est. County Population Jan. 1, 1928	2,339
Land Area	886 sq. miles	Population of County 1920	3,113
County Seat	Wibaux	Population of County Seat	611
Altitude of County Seat	2,635 feet	Growing Season	107-116 Days

By Charles E. White



ALTHOUGH Wibaux County is the third smallest in area of counties in the state, it has the largest percentage of acres under cultivation. It is known as the Gateway County of Montana, for through it the Northern Pacific trains pass on entering the state from the east. While it was known as one of the stock districts in the old range days, today agriculture is its dominant industry.

Surface and Soil: Rolling prairies, table lands and valleys make up the agricultural area, while the grazing lands are devoted to stock raising. The soils of Wibaux County are very fertile and will readily produce all crops adapted to the climate. The best soil is a rich dark loam with a clay subsoil of great depth. It is generally free from objectionable features, holds moisture well and is easily tilled.

Crops: The most important crops grown are wheat, corn, alfalfa, flax, barley, beans, rye, sweet clover and nearly all kinds of root crops, garden vegetables and some varieties of small fruits. Corn is rapidly becoming one of the important feed crops of Wibaux County. Beans are also making rapid progress, Montana white beans averaging 500 to 900 pounds per acre.

Drainage and Water Supply: Wibaux County is well watered by Beaver Creek, which runs north and south through the county. Spring Creek and Smith Creek and numerous springs provide abundance of pure water for stock and household purposes.

Industries: Stock raising, dairying and diversified farming are the industries of the county.

Mineral Resources: Good deposits of lignite coal are within easy reach of almost every farm. This coal may be purchased at the mines at a very low price.

Land Values: Land values vary according to quality and location. Improved non-irrigated lands sell at $15 to $40 an acre and unimproved lands at $5 to $15.

Transportation and Highways: The main line of the Northern Pacific passes through the county. The Red Trail road follows the Northern Pacific and good dirt roads connect all sections of the county.

Education: There are 43 schools in the county, including two high schools, with an enrollment of 851.

Cities and Towns: Wibaux, the county seat, is a modern, up-to-date town in every respect, with mercantile establishments, grain elevators and all marketing facilities for farmers' products. Carlyle is the second largest town in the county.

Climatological: The annual precipitation is between 14 and 15 inches. About 60 per cent of this falls during the months of May, June and July. Sixty per cent of the days are days of sunshine—one of the reasons for success with corn. The winters are fairly mild.

The county agent is located at Wibaux.

Crop Production: The total value of all crops produced in 1927 was $1,615,098, divided as follows: Spring wheat 61,000 acres, acre yield 12, production 732,000 bushels, value $710,040; winter wheat 7,000 acres, acre yield 12, production 84,000 bushels, value $77,280; all wheat 68,000 acres, acre yield 12, production 816,000 bushels, value $787,320; oats 12,000 acres, acre yield 40, production 480,000 bushels, value $211,200; barley 5,600 acres, acre

yield 32, production 179,200 bushels, value $107,520; rye 600 acres, acre yield 16, production 9,600 bushels, value $7,008; flax seed 11,000 acres, acre yield 9.5, production 104,500 bushels, value $182,875; corn 5,000 acres, acre yield 19, production 95,000 bushels, value $68,400; potatoes 500 acres, acre yield 145, production 72,500 bushels, value $47,125; all tame hay 10,000 acres, acre yield 2.3, production 23,000 tons, value $193,200; wild hay 1,300 acres, acre yield 1.0, production 1,300 tons, value $9,750; truck crops and vegetables $700.

Livestock: The value of all livestock products marketed in 1927 totaled $630,700. Combined crops and livestock were $2,245,798.

Value of Industries: The estimated value of manufacturing was $20,000, coal mining $20,145 and tourist $85,000.

Total and Per Capita Production: The total production for the county is valued at $2,370,943 and in per capita production for 1927 the county placed seventh with $1,014.

Real estate and improvements were assessed at $5,359,000 in 1927, livestock at $301,000 and public utilities at $1,072,000. The total assessed value of all property was $7,196,799, with a taxable value of $2,269,228.

Taxes are low, the rate for county purposes in 1927 being only 15 mills on the taxable valuation. The average school levy was 27.02 mills. The average tax on farm and grazing land was 10.3 cents an acre, on horses 30.4 cents a head, on cattle 47.7 cents a head and on sheep 13.4 cents. These figures are considerably below the averages for the entire state.

The per capita net debt for county and school purposes was reduced from $48.43 in 1924 to $37.35 June 30, 1927, at which time the net indebtedness for county purposes stood at $87,569.90, and the net indebtedness of district schools at only $28,694.01.

Additional Information: For more detailed information about the resources of Wibaux County write to Charles E. White, Wibaux, Montana.

GARFIELD COUNTY

Date of Creation,.....April 1, 1919	Est. County Population Jan. 1, 1928...4,368
Land Area,.....4,858 sq. miles	Population 1920,.....5,368
County Seat,..... Jordan	Population County Seat,..... 813
Altitude County Seat,.....2,800 feet (est.)	Growing Season.....124 days

By J. P. McDonald

WERE Garfield County in a position to occupy the rank to which its area and position entitle ie, it would be one of the most important counties in the state. It is approximately 80 miles long, east and west, and 65 miles wide, north and south. Located in the east central part of the state, it is one of the few counties that has no railroad lines within its borders. However, there is no doubt but that as soon as financial conditions permit, the gap in the Great Northern line between Richey and Lewistown will be constructed. The grade and necessary tunnels have been completed from Lewistown east almost to the western boundary of the county. The Northern Pacific has about completed a railroad extending from Glendive to Circle and Brockway, making the present terminus of the line 20 miles from the eastern boundary of Garfield county, and 60 miles from Jordan, the county seat.

Surface and Soil: The surface is generally rolling. The soil types in the Missouri and Musselshell valleys range from clay to heavy clay, while on the uplands a sandy loam is found.

Crops: Small grains, such as wheat, oats, barley, rye and flax are the chief crops. Wheat is grown much more extensively than any of the other grain crops. A general survey made of the county shows a return of 1,234,743 bushels of grain threshed in the county in 1927. Corn is assuming considerable importance, both as a grain and fodder crop.

Drainage and Water Supply: With the Missouri River forming its northern boundary and the Musselshell River its western boundary, these rivers together with the numerous tributaries which flow into them furnish sufficient moisture for the county.

Industries: Stockraising and diversified farming are the chief industries, while mining is carried on less extensively.

Mineral Resources: Coal abounds in all parts of the county. Oil has been discovered in the Cat Creek district, in the west end of the county. Chalk has been found in commercial quantities.

Timber: Abundant growths of cottonwood are found along the creeks and small pine along the rivers, but no timber of marketable value is found.

Land Values: Irrigated lands sell from $25 to $50 an acre; non-irrigated farm lands from $10 to $25 an acre and grazing lands from $5 to $15 per acre.

Transportation and Highways: A daily stage operates between Jordan and Miles City. Much of the marketing and transportation is carried on by means of trucks which are operating in great numbers over all sections of the county; Miles City

receiving the trade of the southeastern portion of the county; Glasgow of the northeastern; Ingomar, Sumatra and Winnett of the western part.

Education: There are 68 schools in the county and two high schools, located at Jordan and Cohagen.

Cities and Towns: Jordan, the county seat, is the principal trading center in the central part of the county, while Edwards, Sand Springs and Mosby are the trading centers in the west end. Cohagen is the chief trading center for the southern part of the county.

Climatological: According to the weather bureau station at Jordan, the average temperature is 42.5 degrees and the average annual precipitation is 12.63 inches. Observations of 14 years record a frost-free period of 123 days.

Crop Production: The total value of all crops in Garfield was $1,978,580, divided as follows: Spring wheat 41,000 acres, acre yield 20, production 820,000 bushels, value $795,400; winter wheat 2,000 acres, acre yield 15, production 30,000 bushels, value $27,600; all wheat 43,000 acres, acre yield 19.8, production 850,000 bushels, value $823,000; oats 12,000 acres, acre yield 38, production 456,000 bushels, value $200,640; barley 1,000 acres, acre yield 26, production 26,000 bushels, value $15,600; rye 2,500 acres, acre yield 22, production 55,000 bushels, value $40,150; flaxseed 13,700 acres, acre yield 10 3, production 141,100 bushels value $246,925; corn 14,000 acres, acre yield 21, production 294,000 bushels, value $211,680; potatoes 600 acres, acre yield 120, production 72,000 bushels, value $46,800; alfalfa seed 925 acres, acre yield 1.0, production 925 bushels, value $12,025; all tame hay 24,000 acres, acre yield 1.6, production 38,400 tons. value $322,560; wild hay 5,400 acres, acre yield 1.15, production 6,200 tons, value $46,500: truck crops and vegetables $12,700.

Livestock: The value of livestock products marketed in 1927 totaled $1,296,000. Combined crops and livestock were valued at $3,274,580.

Value of Industries: The estimated value of manufacturing in 1927 was $29,000, and tourist trade $75,000.

Total and Per Capita Production: The total production for the county is valued at $3,378,580 and per capita production for 1927 at $773.

Livestock was valued for assessment purposes in 1927 at $1,186,000, and real estate and improvements at $14,503,000. The total value of all property was $16,178,491, with a taxable value of $4,864,569. Taxes are lower than average, the tax for all purposes on farm and grazing land being 10.8 cents an acre, on horses 24.2 cents a head, on cattle 49.3 cents a head and on sheep, 16.5 cents.

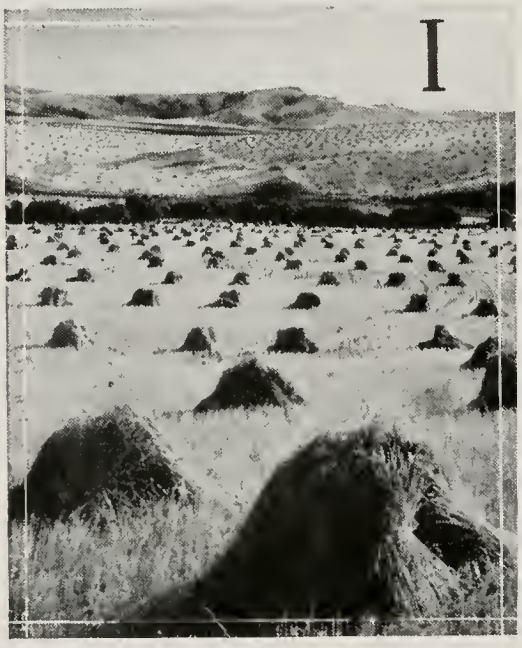
The net county debt was cut from $213,663.22, the 1924 figure, to $173,021 in 1927, and the total net debt of school districts amounted to only $28,192.82 June 30, 1927. The per capita net indebtedness for county and school purposes was $45.15 in 1924. By 1927, it had been reduced to $37.48.

Additional Information: For more detailed information about the resources of Garfield county, write to the secretary of the Commercial Club of Garfield County, at Jordan, Montana.

PRAIRIE COUNTY

Date of Creation	Feb. 5, 1915	Est. County Population Jan. 1, 1928	4,045
Land Area	1,737 sq. miles	Population 1920	3,684
County Seat	Terry	Population, County Seat	794
Altitude of County Seat	2,250 feet	Growing Season	104 to 138 Days

By G. E. Lewis



IN the center of a vast empire known as eastern Montana, Prairie County forms a unit of one of the most promising farm sections.

The county contains approximately 1,250,000 acres, of which 650,000 acres are classified as farming land. The remainder is high class grazing land.

There are two valleys: the Yellowstone River cuts the county almost in equal halves from east to west; and the famous Powder River flows from the southeast to the Yellowstone.

Surface and Soil: The surface is rolling, with the exception of the northwestern part which is quite broken due to the low range of the Mountain Sheep Bluffs.

The soils of Prairie County are of a sandy loam to a sandy clay and gravelly loams underlain with a clay subsoil. They are adapted for practically every crop that can be grown in this climate, being easy to work and very fertile.

Crops: The chief crops grown are wheat, corn, flax, oats, beans, alfalfa, potatoes, rye, barley, spelts, sweet clover and garden truck.

The production of livestock is an important industry and annually hundreds of cars of cattle, sheep, hogs, wool and poultry are shipped from the county.

Drainage and Water Supply: Prairie is a

well watered county. The Yellowstone River flows northeasterly through the county, and is fed by a number of tributaries. The Powder River is the largest southern branch near the western side, while O'Fallon Creek is the largest stream on the eastern side. The northern tributaries are the Brackett, Cedar and Cherry Creeks.

Industries: Agriculture and stock raising are the important industries. Since corn became a standard crop, hog growing is steadily advancing, the tendency being to increase the holdings of livestock in order that a cash market for corn may be provided.

Mineral Resources: The farm fuel question is easily solved in Prairie County as lignite coal is abundant and every farm has its own mine. Hundreds of tons of coal are mined commercially.

Natural gas is found in the eastern part of the county and is piped into the town for heating, cooking and manufacturing purposes.

Timber: There is no commercial timber in the county, but cottonwood, green ash and box elder are found along the streams for farm use.

Transportation and Highways: Two transcontinental railroads cross the county, the Northern Pacific and the Chicago, Milwaukee, St. Paul and Pacific assuring a perfect transport system, and excellent highways are maintained into the farming sections.

Education: Prairie county has 62 schools, including high schools at Mildred and Terry. The rural and city schools are well kept and are equipped with proper facilities for the education of the coming generations.

There are 12 churches scattered over the county and all are in substantial buildings and well equipped to take care of the religious training of the boys and girls, as well as the older people.

Cities and Towns: Terry, the county seat, is located in the center of the county in a natural artesian basin. It is the distributing center of the county, supplied with electricity and natural gas. Mildred is a thriving little town in the southeastern part of the county on the Milwaukee railroad. Fallon is on the Northern Pacific, 10 miles east of Terry, and is a business center.

Climatological: Prairie County has an excellent climate. There are about 296 days of sunshine each year, which is a factor in crop production, as well as health. The altitude is 2,200 to 2,700 feet.

The average annual rainfall is 15 inches, one-half of which falls during the three growing months, May, June and July. Under proper methods of farming, this is ample to insure profitable crops.

Crop Production: Crop production in Prairie County in 1927 is valued at $1,672,385, divided as follows: Spring wheat 64,000 acres, acre yield 13, production 832,000 bushels, value $807,040; winter wheat, 4,000 acres, acre yield 14, production 56,000 bushels, value $51,520; all wheat 68,000 acres, acre yield 13.1, production 888,000 bushels, value $858,560; oats 10,000 acres, acre yield 32, production 320,000 bushels, value $140,800; barley 1,000 acres, acre yield 30, production 30,000 bushels, value $18,000; rye 500 acres, acre yield 16, production 8,000 bushels, value $5,840; flax seed 9,600 acres, acre yield 10.3, production 98,700 bushels, value $172,725; corn 11,000 acres, acre yield 23, production 253,000 bushels, value $182,160; potatoes 300 acres, acre yield 130, production 39,000 bushels, value $25,350; beans 2,700 acres, acre yield 13, production 35,100 bushels, value $105,300; alfalfa seed 600 acres, acre yield 1.75, production 1,050 bushels, value $13,650; all tame hay 5,000 acres, acre yield 2.1, production 10,500 tons, value $88,200; wild hay 6,700 acres, acre yield 1.1, production 7,400 tons, value $55,500; truck crops and vegetables $6,300.

Livestock: Livestock products marketed in 1927 totaled $1,199,100. Combined crops and livestock were valued at $2,871,485.

Value of Industries: The estimated value of manufacturing was $21,000, and tourist $115,000.

Total and Per Capita Production: The total production for the county is valued at $3,007,485 and per capita production for 1927 at $744.

Assessment figures for 1927 show the valuation of the county to be $15,036,485, with real estate and improvements valued at $9,613,000, livestock at $689,000 and public utilities at $3,897,000. The taxable value of all property is $4,937,686.

Taxes are low, the average for county purposes last year being 19 mills on the taxable valuation, and the average levy for school purposes 18.9 mills, both well below the averages for the entire state. The average tax for all purposes on farm and grazing land was 10.2 cents an acre, on horses 27.7 cents a head, on cattle 45.9 cents a head, and on sheep 14.9 cents.

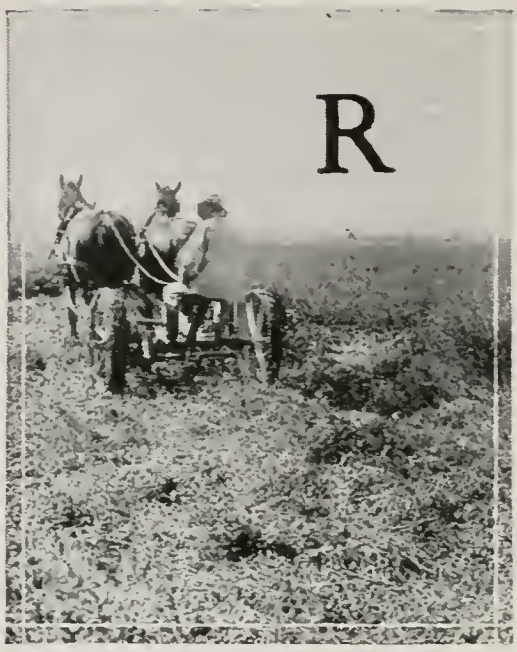
Despite the low tax levies, Prairie County's debt is small and is rapidly becoming smaller. The net indebtedness of the county was $95,120.51 June 30, 1924. June 30, 1927, it was $59,566.04, a reduction of $35,554.47 or more than 37 per cent during the three-year period. By "net indebtedness" is meant the total debt of all kinds, warrants and bonds, less cash in sinking and other funds available to pay that debt. During the same period, the net indebtedness of the school districts was reduced from $39,703.06 to $30,-949.49, or more than 22 per cent, making a total per capita debt for county and school purposes of only $24.57, well down among the lowest in the state.

Additional Information: For more detailed information about the resources of Prairie County, write to the county agent at Terry, Montana.

RICHLAND COUNTY

Date of Creation	May 27, 1914	Est. County Population Jan. 1, 1928	9,674
Land Area	2,102 sq. miles	Population, 1920	8,989
County Seat	Sidney	Population County Seat, 1925	1,800
Altitude County Seat	1,928 feet	Growing Season	120 days

By H. F. DePue



RICHLAND County is entirely agricultural in character and offers splendid opportunities in various types of farms such as irrigated, non-irrigated, diversified, and live stock. It lies in eastern Montana, bordering North Dakota, between the confluence of the Missouri and the Yellowstone Rivers at an elevation ranging from 1,950 to 2,600 feet. It is approximately 65 miles long by 55 miles wide, comprising irrigated valleys and table lands. Its combination of irrigated and non-irrigated land offers opportunities for growing live stock.

Surface and Soil: The surface and soil of the county is varied in character. The soil is rich and very productive and easily worked. The general topography of the surface is rolling.

Crops: A wide range of crops are produced consisting of all the small grains, namely: corn, beans, peas, sugar beets, alfalfa, sweet clover, and wheat grass.

Drainage and Water Supply: The drainage of the county is excellent, there being practically no swampy land except a little in the irrigated districts. The general water supply is good. Good wells can be obtained at depths ranging from 10 to 60 feet, and good water for stock is usually found in springs and running creeks.

Industries: The important industries of the county are agriculture and the raising of live stock. A flour mill and sugar factory are located at Sidney, and a coal mine, electric light plant, brick plant, bottling works, and flour mill at Fairview.

Mineral Resources: An abundance of a good grade of lignite coal is found in practically every section of the county, thereby assuring cheap supplies of fuel.

Timber: There is an abundance of timber, used for wood, along both the Missouri and Yellowstone Rivers.

Land Values: Land values range from $2 to $25 per acre for non-irrigated land and from $20 to $100 for irrigated land.

Transportation and Highways: The county is traversed by the Great Northern and Northern Pacific Railways. The Great Northern crosses the county from east to west, and the Northern Pacific north and south. The highways are good and practically all sections of the county have graded roads.

Education: The educational system of the county is better than the average. The county has a public school system of over 100 graded schools and four accredited high schools.

Cities and Towns: Sidney, the county seat, is the largest town in the county, with a population of 1,800. Fairview, Lambert and Savage are the other important towns.

Climatological: The climate of the county is healthful and conductive to the production of high grade seeds of all kinds that bring premiums on the markets of the country.

Crop Production: Richland county placed eighth in the state with a total value for all crops of $4,749,750. The county was also first in corn production and third in sugar beets. The value of the various crops is as follows: Spring wheat, 121,000 acres, acre yield 21, production 2,541,000 bushels, value $2,464,770; winter wheat, 12,000 acres, acre yield 15, production 180,000 bushels, value $165,600; all wheat, 133,000 acres, acre yield 20.5, production 2,721,000 bushels, value $2,630,370; oats, 24,000 acres, acre yield 35, production 840,000 bushels, value $369,600; barley 6,500 acres, acre yield 29, production 188,500 bushels, value $113,100; rye 3,800 acres, acre yield 20, production 76,000 bushels, value $55,480; flaxseed, 13,700 acres, acre yield 10, production 137,000 bushels, value $239,750; corn 20,000 acres, acre yield 27, production 540,000 bushels, value $388,800; potatoes 800 acres, acre yield 135, production 108,000 bushels, value $70,200; beans 3,300 acres, acre yield 13, production 42,900 bushels, value $128,700; seed peas, 150 acres, acre yield 21, production 3,100 bushels, value $6,510; alfalfa seed 475 acres, acre yield 1.75, production 830 bushels, value $10,790; all tame hay, 30,000 acres, acre yield 1.7, production 51,000 tons, value $428,400; wild hay 10,800 acres, acre yield .8, production 8,600 tons, value $64,500; truck crops and vegetables, $9,800; sugar beets 2,750 acres, acre yield 10, production 27,500 tons, value $233,750.

Livestock: Livestock products marketed in 1927 totaled $1,284,300. Richland county placed tenth in combined crops and livestock production with a total of $6,034,050.

Value of Industries: The estimated value of manufacturing was $202,000. The value of coal mining was $67,881, giving Richland fifth place, and tourist was $132,000.

Total and Per Capita Production: The total production for the county is valued at $6,435,931 and per capita for 1927 at $665.

The county agent and home demonstration agent are located at Sidney.

The total assessed valuation of Richland county in 1927 was $19,013,720. Real estate and improvements were valued at $14,243,069, livestock at $689,900, other personal property at $2,281,445, public utilities at $1,791,394, and net proceeds of mines at $7,912. The taxable valuation runs about 30 percent of the assessed value.

The county tax rate last year was 26 mills on the taxable value. The levy for school purposes was 31.4 mills. The average tax on farm and grazing lands was 17.9 cents an acre, on horses 49.2 cents a head, on cattle 59.3 cents a head and on sheep the tax was 16.4 cents a head.

The net indebtedness of the county June 30, 1924, was $202,434.89. June 30, 1927, it was $179,095.42, a reduction of 11½ percent. This reduction was accomplished despite the fact that bonds to the amount of $85,000, issued to a courthouse, were sold during this period.

School districts also reduced net indebtedness about 10 percent during the three years, the district school debt totaling $207,138.85 June 30, 1927. On that date, the per capita debt, net, for county and school purposes was $42.96, which is about $17 less than the average throughout the state.

Additional Information: For more detailed information about the resources of Richland county, write to the Chamber of Commerce, Sidney, Montana.

McCONE COUNTY

Date of Creation,	April 1, 1919	Est. County Population Jan. 1, 1928	4,686
Land Area,	2,684, sq. miles	Population 1920,	4,747
County Seat,	Circle	Population County Seat,	300
Altitude County Seat,	2,800 feet	Growing Season,	90 to 100 days

By Nate H. Bovee

WHILE the large area of fertile land has attracted many farmers, up to the present time McCone County has been handicapped by lack of adequate transportation facilities. From the Missouri River, its northern boundary, it extends southerly about 55 miles and easterly, from Big Dry Creek, about 40 miles. The Redwater River rises in the southern end of the county and runs through it in a northerly direction. There is good farming land in every section of the county. Towns are located to serve the people.

Surface and Soil: The surface of the county varies from flat river valleys to rough land, generally described as rolling. Soil types vary from a clay loam in the valleys to a sandy loam on the benches. Non-irrigated farming is followed almost exclusively. The soil has an abundance of fertility, retains moisture well and is easy to handle.

Crops: The chief crops are wheat, oats, flax, corn, sweet clover, alfalfa, barley, potatoes, beans and garden truck. Some small fruit is produced for home consumption. Corn is assuming a very important place in the cropping system of the county, 14,000 acres being harvested in 1927.

Drainage and Water Supply: Drainage in the county is adequate. Good water is easily accessible for domestic purposes. There are a number of clear springs and creeks with open running water the entire year. Good wells run from 10 to 100 feet in depth.

Industries: Agriculture, live stock, beef and dairy cattle, hogs, horses, sheep, and poultry raising. Diversified farming has brought about an increased interest in the dairy business.

Land Values: Unimproved land brings from $7 to $30 per acre, depending upon character and location. The average price for the better class of farm land within a reasonable distance of market is $15 to $20 per acre. Lands are classified so that taxes are based upon quality and location.

Transportation and Highways: The county is justly proud of well maintained state and county highways. Good graded roads run in every direction. As most of the hauling is done with motor trucks, it means that roads must be good. The Northern Pacific is building a branch line from Glendive to Circle and Brockway, which will be completed during 1928. New settlers started moving into the county early in 1928 and will be followed by others as construction is completed.

Education: McCone County has a splendid rural school system. Circle has a fully equipped high school. Number of schools in county, 61; enrollment, 1,010.

Cities and Towns: Circle, the county seat, is located in the south central part of the county. This town has banks, general stores, a flour mill, creamery and good schools. Brockway, 12 miles south of Circle, serves a larger territory, as does Vida. Other towns and postoffices include: Bonin, Hamblin, Horse Creek, McCone, Nickwall, Paris, Pattonhill, Prairie Elk, Redwater, Riverside, Sand Creek, Watkins, and Weldon.

Climatological: Much sunshine rapidly matures the crops and is responsible for the high quality of McCone county wheat. The annual precipitation is 19.06 inches, approximately half of this amount falling during May, June and July.

Crop Production: In the production of flax McCone county placed fourth. Total crop production is valued at $2.896,443, divided as follows: Spring wheat 78,000 acres, acre yield 18, production 1,406,000 bushels, value $1,363,820; winter wheat 6,000 acres, acre yield 25, production 150,000 bushels, value $138,000; all wheat 84,000 acres, acre yield 18.5, production 1,556,000 bushels, value $1,501,820; oats 18,000 acres, acre yield 33, production 594,000 bushels, value $261,360; barley 2,200 acres, acre yield 31, production 68,200 bushels, value $40,920; rye 1,300 acres, acre yield 27, production 35,100 bushels, value $25,623; flaxseed 23,600 acres, acre yield 9.8, production 231,200 bushels, value $404,600; corn 14,000 acres, acre yield 21, production 294,000 bushels, value $211,680; potatoes 300 acres, acre yield 130, production 39,000 bushels, value $25,350; all tame hay 18,000 acres, acre yield 2.2, production 39,600 tons, value $332,640; wild hay 10,800 acres, acre yield 1.12, production 12,100 tons, value $90,750; truck crops and vegetables $1,700.

Livestock: The total value of livestock products marketed in 1927 was $1,259,900. Combined crops and livestock were valued at $4,156,343.

Value of Industries: The estimated value of manufacturing was $24,000 and tourist $85,000.

Total and Per Capita Production: The total production for the county was valued at $4,265,343 and per capita for 1927 at $910.

The assessed value of all property in the county in 1927 was $15,704,874, of which $14,390,000 represents the value of real estate and improvements. Livestock was valued at $829,000. The total taxable valuation was $4,714,376.

The tax rate for county purposes was 20.25 mills on the dollar of taxable value, and the levy for school purposes averaged 18.47 mills. Both of these rates are considerably below state averages. The total general tax for all purposes averaged 13.5 cents an acre on farm and grazing lands, 60.9 cents a head on horses, 44.1 cents a head on cattle and 14.1 cents a head on sheep.

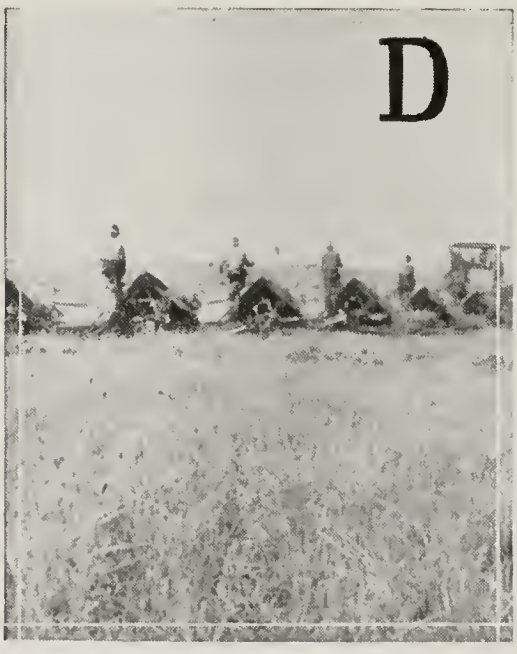
McCone's debt June 30, 1924 amounted to $131,005.12. June 30, 1927 it was $91,590.66, a 30 per cent reduction in three years. The net indebtedness of school districts was also reduced during this period from $63,934.41 to $56,718.74. The per capita net debt for county and school purposes is $31.26, or a little more than half as much as the average for the entire state.

Additional Information: For more detailed information about the resources of McCone County write to the state publicity division, Helena, Montana.

DAWSON COUNTY

Date of Creation	Jan. 15, 1869	Est. County Population Jan. 1, 1928	8,895
Land Area	2,383 sq. miles	Population of County 1920	9,239
County Seat	Glendive	Est Population County Seat	4,900
Altitude of County Seat	2,071 feet	Growing Season	104 to 131 Days

By J. L. Taylor



DAWSON is the eleventh of Montana's counties in order of creation, dating from 1869. It then included all or part of the present counties of Valley, Sheridan, Richland, Wibaux, Prairie, Phillips, Roosevelt, McCone, Garfield and Daniels. Glendive is the county seat and is the operating point for 559 miles of Northern Pacific trackage.

Surface and Soil: The territory immediately adjacent to the Yellowstone River and its tributaries is hilly and broken; but the upland portions of the county are well suited to non-irrigated farming. Approximately 900,000 acres are tillable, about sixty per cent of the county area. The soil is a medium loam with deep clay subsoil. It works easily, warms up early in the spring, holds moisture well, and is rich in the elements essential to heavy crop production. Commercial fertilizer is not required.

Crops: Spring wheat is the principal cash crop, with a 1927 average production of 18 bushels per acre on more than one hundred thousand acres. A lesser acreage claims winter wheat, while other profitable crops are flax, oats, corn, speltz and barley. Alfalfa produces heavily on sub-irrigated bottom lands. Corn acreage is being extended rapidly, with resulting increase in production of pork.

Drainage and Water Supply: The Yellowstone River flows in a northeasterly direction through the southeastern portion of the county, while the Redwater River cuts the extreme northwestern townships. Numerous small streams draining into these rivers afford ample water for livestock and for local irrigation of farm tracts.

Land Values: Irrigated lands range in price from $40 to $125 an acre; non-irrigated from $5 to $50, and grazing areas from $3 to $12 an acre.

Industries: Agriculture and stock raising are the chief industries. Farming is

being rapidly diversified, and the production of corn and hogs is increasingly important. Many bands of sheep are maintained in the county.

Mineral Resources: Dawson County is underlaid with vast deposits of lignite coal, insuring cheap fuel for all residents. Natural gas has been developed in large volumes in the southeastern part of the county, and is now being supplied for domestic and industrial consumption in Glendive and cities as far distant as the Black Hills of South Dakota. Extensive and varied clay deposits offer splendid industrial opportunities.

Transportation: Transportation facilities are good except in the northeastern quarter of the county. The main line of the Northern Pacific Railway crosses the southeastern quarter; a branch of this road extends down the Yellowstone Valley from Glendive to Sidney in Richland County; and a second branch extends northwest from Glendive to Circle and Brockway in McCone County. A branch of the Great Northern Railway, from the main line at Snowden, has its terminus at Richey, in the extreme northern part of the county. There are several well-improved highways, of which the principal one is U. S. Highway No. 10, locally known as the National Parks Highway.

Cities and Towns: Glendive, the county seat, is the principal settlement. It is a complete modern city, with paved streets, many beautiful homes, substantial business houses, a flour mill, creameries, four strong banks, two hospitals and seven churches. The Northern Pacific maintains complete shop service at Glendive. Richey is the second largest town, while Lindsay, Bloomfield, Union, Intake and Stipek are local trading points.

Education: Dawson County has 91 schools, with a total enrollment of 2,406. One high school is located at Richey, while the County High School is in Glendive.

Climatological: The climate is very healthful and favorable for crop growth. Two-thirds of the days are clear, yielding an abundance of sunshine. The average rainfall is 15.93 inches, of which 10.95 inches falls from April first to September, during the growing season.

Crop Production: Dawson county placed second in the production of flax seed and fourth in corn in 1927. Total crop production was valued at $3,726,155, divided as follows: Spring wheat 105,000 acres, acre yield 18, production 1,908,000 bushels, value $1,850,760; winter wheat 3,000 acres, acre yield 19, production 57,000 bushels, value $52,440; all wheat 108,000 acres, acre yield 18.2, production 1,965,000 bushels, value $1,903,200; oats 22,000 acres, acre yield 37, production 814,000 bushels, value $358,160; barley 4,000 acres, acre yield 36, production 144,000 bushels, value $86,400; rye 1,300 acres, acre yield 15, production 19,500 bushels value $14,235; flax seed 24,500 acres, acre yield 12, production 294,000 bushels, value $514,500; corn 15,000 acres, acre yield 28, production 420,000 bushels, value $302,400; potatoes 800 acres, acre yield 150, production 120,000 bushels, value $78,000; beans 900 acres, acre yield 15, production 135,000 bushels, value $40,500; all tame hay 16,000 acres, acre yield 1.9, production 30,400 tons, value $255,360; wild hay 19,000 acres, acre yield 1.2, production 22,800 tons, value $171,000; truck crops and vegetables $2,400.

Livestock: The value of all livestock products marketed in 1927 totaled $1,622,900. Combined crops and livestock were valued at $5,349,055.

Value of Industries: The estimated value of manufacturing in 1927 was $578,000 and tourist $200,000.

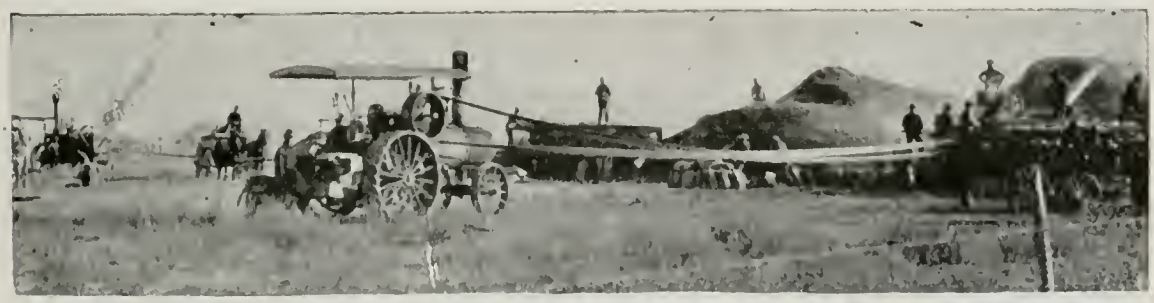
Total and Per Capita Production: The total production for the county is valued at $6,127,055 and per capita for 1927 at $689.

The assessed valuation of all property last year was $21,095,788, the value of real estate and improvements accounting for two-thirds of this total. Livestock was assessed at $689,000 and public utilities at $3,580,000. The total taxable value was $6,662,241.

The county tax rate in 1927 was 32 mills on the dollar of taxable valuation, and the average levy for school purposes was 28.42 mills. The tax for all purposes on farm and grazing land was 14.3 cents an acre, just about the average throughout the state. The tax on horses was 38 4 cents a head, on cattle, 63.4 cents a head, and on sheep, 19.4 cents.

The net indebtedness of the county June 30, 1924, amounted to $670,483.86. June 30, 1927, it was $513,458.00, a reduction of $157,025.86 in three years. During the same period, district schools decreased their net debt from $184,245.68 to $135,707.86, more than 25 per cent. The per capita net debt for county and school purposes is $70.26.

Further Information: More detailed information may be had by addressing The Secretary, Chamber of Commerce, Glendive, Montana.



A FAMILIAR SCENE IN THE COUNTRY

CENTRAL MONTANA

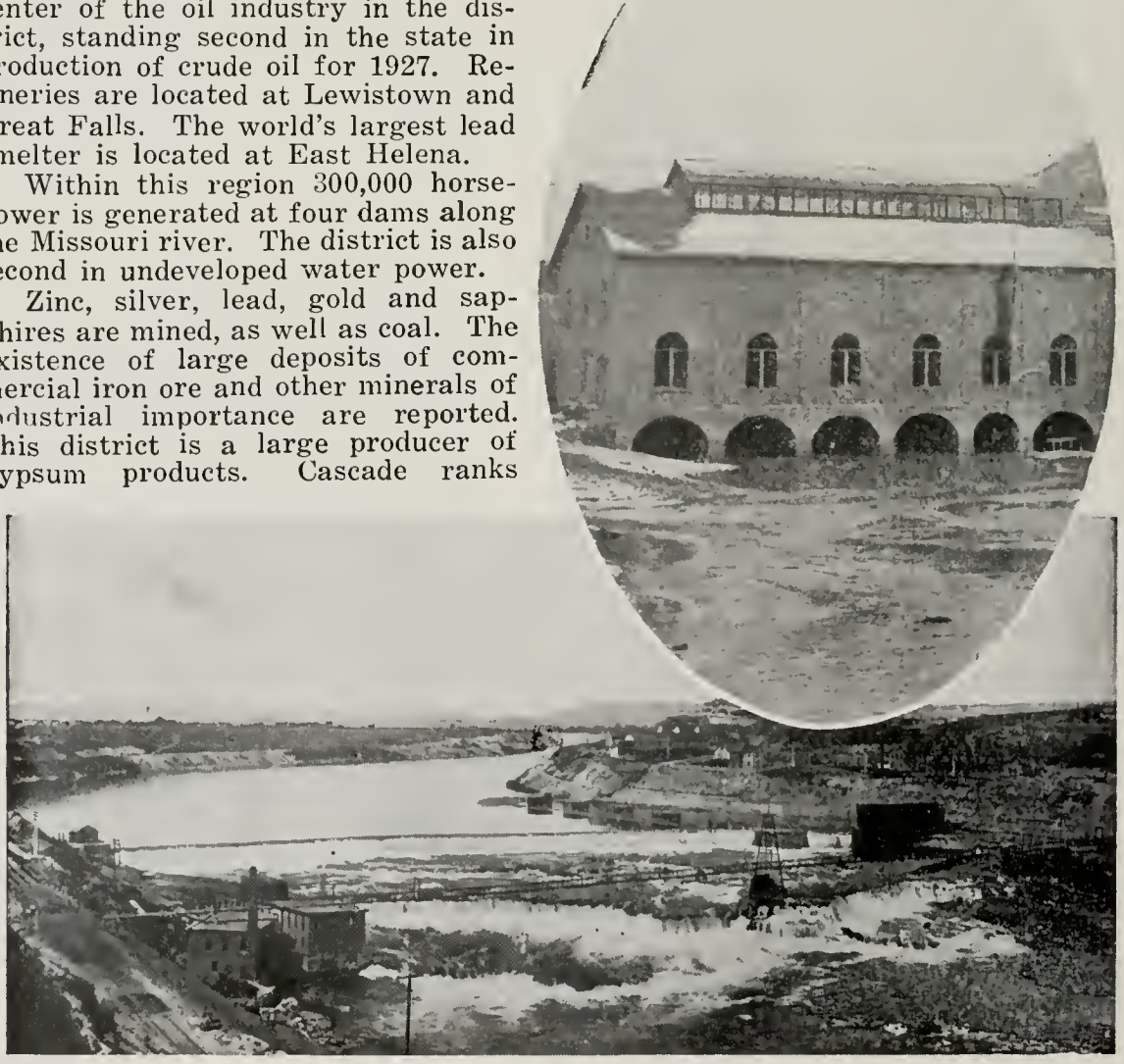
In Developed Energy Resources Stands in First Place—Most of Its Area Included Within the Mountain Region—Stockraising and General Farming—Varied Industrial Development.

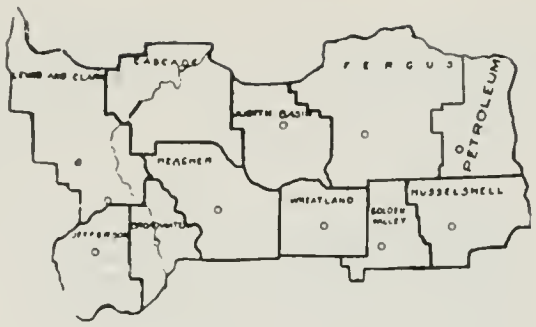
Originally a mining and a stockraising region, Central Montana, which extends from the Musselshell river on the east to the crest of the continental divide on the west, and includes the counties of Fergus, Musselshell, Golden Valley, Wheatland, Judith Basin, Meagher, Cascade, Lewis and Clark, Broadwater, Jefferson, and Petroleum, is one of the principal industrial regions of the state. Mining, stockraising and general farming are also important.

Leading the state in developed hydro-electric power, this district is a natural center of industrial activities. Cascade and Lewis and Clark are second and third respectively among counties of the state in value of manufactured output for 1927. Manufacturing enterprise consists mainly in smelting, oil refining, production of power and flour milling. The smelter and reduction works including the largest copper wire mill in the world, located at Great Falls employs about 1800 men; Petroleum county is the center of the oil industry in the district, standing second in the state in production of crude oil for 1927. Refineries are located at Lewistown and Great Falls. The world's largest lead smelter is located at East Helena.

Within this region 300,000 horsepower is generated at four dams along the Missouri river. The district is also second in undeveloped water power.

Zinc, silver, lead, gold and sapphires are mined, as well as coal. The existence of large deposits of commercial iron ore and other minerals of industrial importance are reported. This district is a large producer of gypsum products. Cascade ranks





second in value of output from metal mines and quarries, Fergus and Jefferson tie for fourth place, Lewis and Clark is sixth, and Judith Basin seventh. Renewed activity in gold mining in Lewis and Clark county will probably be placing the district high in value of mineral output.

Musselshell county stands at the head of coal producing counties. During 1927 $2,855,133 worth of coal was taken out of the mines of Musselshell county. Cascade is a commercial producer of coal, ranking fourth in the state.

Nineteen and seven-tenths per cent of all the land in farms in Montana is in this district and 18 per cent of all crops are produced here. The district produces 36 per cent of the winter wheat, 23 per cent of the tame hay, 23 of alfalfa hay, 20 of all wheat, 20 of potatoes, 16 of spring wheat, 16 of oats, 16 of barley, 14 of wild hay, 12 of corn, seven of rye, six of seed peas, four of dry beans, two of apple trees, one of flax, one of alfalfa seed and one per cent of the sugar beets.

In the western two thirds, or eastern slope district, diversified agriculture has been well established. In this district is found a wide variation of production enterprises ranging from straight wheat farms to specialized cattle and sheep ranches. Both of these extreme types are possible because of conditions which favor low cost production. Because of the wheat acreages of Fergus and Judith Basin counties the district holds second place in this crop. Fergus county ranked first last year in the value of all crops produced, and Cascade tenth. The area ranks second in potatoes and alfalfa.

Central Montana is particularly adapted to wheat production because of the possibility of growing both spring and winter wheat of high quality under conditions which permit large farm units and which favor the use of cost reducing machinery and methods. Units of at least two sections seem most desirable for large scale general farming.

There is much grazing land in the district. In the western half there are many national forests. Livestock is important as a stabilizer for farming enterprises.

The Montana Extension service makes the following recommendations for central Montana agriculture:

Wheat will probably remain the major cash crop of the district and tillage is the major controlling factor in its production. Summer tillage is almost indespensable in the successful production of wheat.

Barley is the highest yielding small grain feed crop and a more favorable place should be given this crop in farm rotations.

The remaining open land should be brought under controlled grazing.

Pork production is a profitable side line to the livestock business.

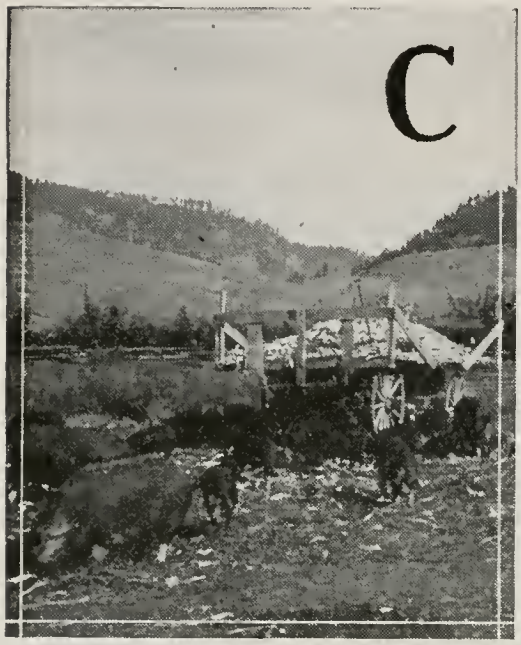
Small flocks of sheep should be encouraged.

Dairying and poultry raising are important in the district. A few large highly specialized dairy farms are to be found and turkey raising has become a profitable industry.

MUSSELSHELL COUNTY

Date of Creation	March 1, 1911	Est. County Population Jan. 1, 1928	7,286
Land Area	1,900 square miles	Population 1920	11,938
County Seat	Roundup	Population County Seat 1920	2,450
Altitude of County Seat	3,184 feet	Growing Season	141-144 days

By Arthur E. Dye.



COAL production in 1927 gave first place to Musselshell county, which is situated just south of the geographical center of the state, and is 55 miles from east to west and 42 miles from north to south. It receives its name from the river which traverses the county from east to west, turning abruptly to the north and defining the north half of the easern border. While there are about 15,000 acres under ditch, non-irrigated farming has made more progress than irrigated farming.

Surface and Soil: In the extreme northern and southern parts of the county along the Bull Mountains, near the southern border, the land is rolling, and in some places mountainous, consequently being well adapted for grazing, while in the open good crops are produced. The central portion of the county is mostly level, with frequent benches, which produce splendid wheat crops, owing to their adaptability to conserve moisture. The soil varies to a great extent, all being of good depth. Along the river a heavy loam predominates, producing high yields of all grains, corn, alfalfa and garden truck. On the benches a limestone gravel soil is found capable of easy cultivation and producing wheat.

Crops: Both winter and spring wheat are grown, the latter being the main cash crop. Corn also returns good yields of both grain and fodder, while oats, rye, barley, flax, alfalfa, timothy, clover, potatoes, beans and vegetables of all kinds prosper.

Drainage and Water Supply: Though the principal source of water supply is furnished from the Musselshell River, about 12,000 acres along its banks are irrigated. Several thousand acres of land in the northern portion of the county receive sufficient water from Willow Creek. Wells for domestic purposes furnish abundant supply on farms, water being found at a depth of 20 to 60 feet in most sections of the county.

Industries: Coal production exceeded any other county in the state during 1927. Farming, cattle, sheep and hogs are increasingly becoming more important and the dairy industry is growing. The Roundup creamery and a cream buying station receive cream from the whole county and some adjoining territory. Coal enough in the ground to last at least 100 years.

Mineral Resources: Coal has been found in exceedingly large quantities and some oil has been discovered and is being marketed, while a deposit of sapphires exists in the Arkwright Bench district.

Timber: The Bull Mountains and the Snowy Mountains produce timber of a merchantable quality.

Land Values: While the price of land naturally depends upon the location and improvements, irrigated lands sell from $40 to $75 per acre; improved land, $20 to $75; raw agricultural, $10 to $30; while grazing sells at $5 to $10 per acre.

Transportation and Highways: The main line of the Chicago, Milwaukee, St. Paul and Pacific Railway and the Electric Highway traverse the county from east to west, while the Custer Battlefield Highway crosses the county from north to south.

Education: Out of 56 schools in the county two are accredited high schools, with a total enrollment of 2,500.

Cities and Towns: Roundup, the county seat, is a modern up-to-date community, while the coal mines which are situated within four miles of the city, form an important distributing and shipping point for the farm and stock districts. Musselshell, Melstone and Delphia are other important towns.

Climatological: The annual normal temperature is 45.0 degrees, and the average annual precipitation is 15 40 inches, according to the Roundup weather bureau station. An observation of seven years records an average frost-free period of 140 days.

Crop Production: The value of all crops in Musselshell county totaled $1,920,520, divided as follows: Spring wheat, 46,000 acres, acre yield 19, production 874,000 bushels, value $847,780; winter wheat 20,000 acres, acre yield 21, production 420,000 bushels, value $386,400; all wheat 66,000 acres, acre yield 19.6, production 1,294,000 bushels, value $1,234,180; oats 8,000 acres, acre yield 35, production 280,000 bushels, value $123,200; barley 2,200 acres, acre yield 24, production 52,800 bushels, value $31,680; rye 2,500 acres, acre yield 22, production 55,000 bushels, value $40,150; flaxseed 300 acres, acre yield 10, production 3,000 bushels, value $5,250; corn 10,000 acres, acre yield 20, production 200,000 bushels, value $144,000; potatoes 600 acres, acre yield 130, production 78,000 bushels, value $50,700; beans 550 acres, acre yield 12, production 6,600 bushels, value $19,800; all tame hay 16,000 acres, acre yield 1.9, production 30,400 tons, value $255,360; wild hay 2,700 acres, acre yield .75, production 2,000 tons, value $15,000; truck crops and vegetables $1,200.

Livestock: Livestock products marketed in 1927 totaled $1,236,500. Combined crops and livestock are valued at $3,157,020.

Value of Industries: The estimated value of manufacturing is $260,000. Musselshell is first in coal mining with an output valued at $2.855,133. The value of the tourist trade in 1927 is estimated at $150,000.

Total and Per Capita Production: The total production for the county is valued at $6,422,153 and per capita for 1927 at $881.

Assessment statistics for 1927 value real estate and improvements at $8,696,875, livestock at $455.186, public utilities at $2,734,786 and net proceeds of mines at $241,245. The total assessed value of all property was $13,782,476, with a taxable value of $4,811,768.

The tax rate for county purposes was 29.5 mills on the taxable valuation last year. The average school levy was 33.88 mills. The total tax for all purposes was 11.4 cents an acre on farm and grazing land, 50.9 cents a head on horses, 78.4 cents a head on cattle and 24.4 cents a head on sheep.

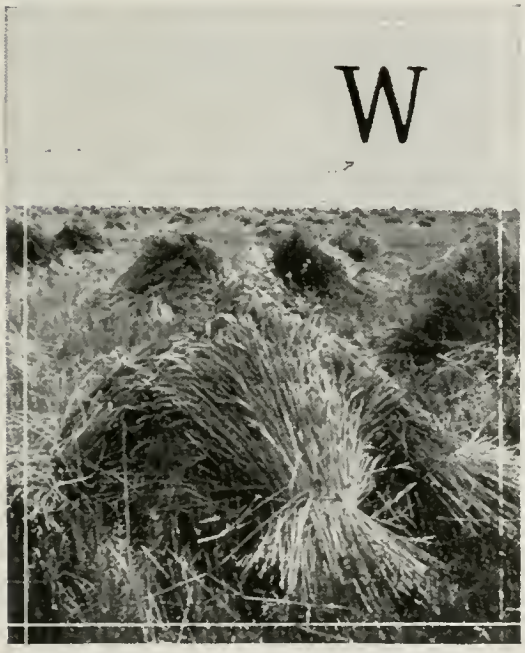
The net indebtedness of the county dropped from $1,051,992.20 June 30, 1924, to $911,-294.48 June 30, 1927. During the same period, the net indebtedness of school districts showed little change. This debt amounted to $206,860.15 June 30, 1927, making a per capita net debt of $134.23 for county and school purposes on that date.

Additional Information: For more detailed information about the resources of Musselshell county, write to Roundup Chamber of Commerce, Roundup, Montana.

WHEATLAND COUNTY

Date of Creation	April 1, 1917	Est. Population of County Jan. 1, 1928	4,184
Land Area	1,419 square miles	Population of County 1920	5,619
County Seat	Harlowton	Population County Seat	2,200
Altitude of County Seat	4,200 feet	Growing Season	May to Sept. inclusive

By R. H. Dunn.



WHEATLAND county lies in central Montana. The Big Belt and Big Snowy Mountains mark its northern border, and the lower levels of the Crazy Mountains extend over into the southwestern part. The Musselshell River runs east and west through the middle of the county, and receives the drainage of many tributaries from both the north and the south. The land is generally level, sloping gently toward the Musselshell River. Harlowton, the county seat, is a railroad junction and is so situated as to command the trade of a large territory. Stock raising, diversified farming on irrigated and non-irrigated land are the leading industries of the county, although considerable drilling for oil is being done.

Surface and Soil: Soil on the bottom lands varies from clay to heavy clay loams, underlain in most parts with a gravelly limestone substance. Greater variation is shown on the bench lands and foothills, the soils ranging from sandy to gravelly loams, which are rich in limestone.

Crops: Wheat, oats, barley, flax, alfalfa, timothy, bromus, corn, and sugar beets are successfully raised, as well as all garden crops. Spring wheat is the principal crop of the county, followed by tame hay, wild hay, winter wheat, etc. Alfalfa is the chief crop in the irrigated districts. On the non-irrigated bench lands sweet clover is grown successfully.

Drainage and Water Supply: The bottom lands of the Musselshell River are largely under irrigation. Steps have been taken for the reclamation of 22,799 additional acres, and it is expected that the irrigation project will started this year.

Industries: The western part of the county is largely devoted to cattle and sheep raising. Dairying is becoming one of the leading industries. There are nine grain elevators in the county and a flour mill located at Harlowton.

Mineral Resources: Coal is the principal mineral of the county. Some drilling for oil is being done and it is believed there are deposits of gypsum near the Big Snowy Mountains.

Timber: The Jefferson National Forest embraces three sides of the county.

Land Values: Irrigated land sells at from $50 to $100 per acre; non-irrigated land from $5 to $20 per acre.

Transportation and Highways: Transportation facilities are good. The main line of the Chicago, Milwaukee, St. Paul and Pacific Railway follows the Musselshell River through the center of the county. Harlowton, in the geographical center of the county, is a division point where the electrified portion of the road across the mountains begins. The Great Northern Railway runs through the northeast corner of the county. Highways give connection with all points.

Education: Number of graded schools, 34; enrollment 950. Number of high schools, 4; enrollment, 230.

Cities and Towns: Harlowton, 2,000; Judith Gap, 500; Hedgesville, 300; Shawmut, 200 and Two Dot, 150.

Climatological: Cool in summer and very moderate in winter. Annual precipitation 18 to 20 inches and annual temperature 40.8 degrees.

Crop Production: Total crops in 1927 were valued at $1,057,120, divided as follows: Spring wheat 40,000 acres, acre yield 13, production 520,000 bushels, value $504,400; winter wheat 2,000 acres, acre yield 15, production 30,000 bushels, value $27,600; all wheat 42,000 acres, acre yield 13.1, production 550,000 bushels, value $532,000; oats 7,000 acres, acre yield 38, production 266,000 bushels, value $117,040; barley 1,000 acres, acre yield 30, production 30,000 bushels, value $18,000; rye 800 acres, acre yield 20, production 16,000 bushels, value $11,680; flaxseed 100 acres, acre yield 10, production 1,000 bushels, value $1,750; corn 2,000 acres, acre yield 21, production 42,000 bushels, value $30,240; potatoes 300 acres, acre yield 100, production 30,000 bushels, value $19,500; seed peas 150 acres, acre yield 20, production 3,000 bushels, value $6,300; all tame hay 18,000 acres, acre yield 1.7, production 30,400 tons, value $255,360; wild hay 6,700 acres, acre yield 1.3, production 8,700 tons, value $65,250.

Livestock: The value of livestock products marketed in 1927 totaled $1,326,300. Combined crops and livestock were valued at $2,383,420.

Value of Industries: The estimated value of manufacturing was $437,000 and tourist $150,000.

Total and Per Capita Production: The total production was valued at $2,970,420 and per capita production for 1927 at $710.

Assessment figures for 1927 value all property in the county at $17,722,674, with real estate and improvements assessed at $10,788,000, livestock at $1,219,000 and public utilities at $4,323,000. The total taxable value of all property was $5,749,720.

For years Wheatland's tax levies have been exceptionally low. The rate for county purposes last year, 13 mills on taxable valuations, was the lowest in the state, and but three counties had a lower average rate for school purposes. Taxes for all general purposes averaged only 11.5 cents an acre on farm and grazing lands, 27 cents a head on horses, 39 cents a head on cattle and 10.8 cents a head on sheep.

The county's financial obligations have not been neglected in this successful effort to keep taxes down to bedrock. Its net debt was cut from $284,710.55 to $244,090.22 during the three years ending June 30, 1927, and the net debt of school districts was reduced from $167,495.17 to $119,944.28 during the same period. The per capita net debt for county and school purposes was $64.78 June 30, 1927.

Additional Information: For more detailed information about the resources of Wheatland county, write to the Chamber of Commerce, Harlowton, Montana.

GOLDEN VALLEY COUNTY

Date of Creation	June 21, 1920	Est. County Population Jan. 1, 1928	2,665
Land Area	1,173 square miles	Population County Seat 1920	525
County Seat	Ryegate	Altitude County Seat	3,632
Growing Season	160 days		

By H. G. Jacobson.

SITUATED in the south central part of the State, Golden Valley county is almost wholly agricultural. The timber reserve in the Snowy Mountains in the northern part of the county are attractive to the stockmen where their herds can pasture in the summer, and the foothills to the south are ideal in the winter time. That part of the county south of the Musselshell River is more developed as an agricultural district. The entire county is well supplied with creeks of pure water.

Surface and Soil: The surface is rolling, the main drainage being into the Musselshell River. The soil varies from a sandy loam to a heavy gumbo. Rougher portions are covered with nutritious grasses.

Crops: The tillable area, comprising about 50 per cent, is devoted to raising of small grains such as wheat, oats, rye, barley and corn. The corn acreage gradually increases each year.

Drainage and Water Supply: Musselshell River crosses the county from west to east, fed by numerous creeks which drain the entire county. The streams which rise in the Snowy Mountains furnish waters for irrigation.

Industries: .The dairying industry is now an important factor in prosperity. The growing of turkeys has in the past few years made great headway, several carloads having been shipped within the past two years. The raising of cattle and sheep is an old and well established industry in this county.

Mineral Resources: The commercial production of coal is small, and confined to fuel for local needs. The existence of alabaster is reported from the north end of the county. Several potential oil structures have been mapped by geologists and some drilling has been done.

Timber: Lumbering is carried on on a small scale in the foothills of the Snowy Mountains in the north end of the county.

Land Values: Land values vary from the cheaper grazing land at $4 per acre to the developed agricultural land at $25 per acre, while the irrigated land along the Musselshell River and creeks sells at a much higher figure.

Transportation and Highways: The county seat is very fortunate in the matter of transportation. It is served by the transcontinental line of the Chicago, Milwaukee, St. Paul and Pacific Railway, which follows the Musselshell River through the southern portion of the county, as well as the Great Northern crossing the county diagonally from north to south. There are 940 miles of county roads and highways.

Education: There are 47 school districts in the county which provide ample school facilities. There are also four accredited high schools in the county.

Cities and Towns: Ryegate, on the Milwaukee, is the county seat. Lavina, Barber, Belmont, and Franklin are other important trading centers.

Climatological: The mild winters make this part of Montana attractive not only to the farmer but the stockman as well. The summers are also favored by the cool breezes from the Crazy Mountains on the west and the Snowy Mountains on the north.

Crop Production: The value of all crops in Golden Valley county totaled $1,772,540, divided as follows: Spring wheat 40,000 acres, acre yield 22, production 880,000 bushels, value $853,600; winter wheat 22,000 acres, acre yield 15, production 330,000 bushels, value $303,600; all wheat 62,000 acres, acre yield 19.5, production 1,210,000 bushels, value $1,157,200; oats 7,000 acres, acre yield 36, production 252,000 bushels, value $110,880; barley 2,200 acres, acre yield 30, production 66,000 bushels, value $39,600; flaxseed 300 acres, acre yield 9.5, production 2,800 bushels, value $4,900; corn 8,000 acres, acre yield 23, production 184,000 bushels, value $132,480; potatoes 300 acres, acre yield 120, production 36,000 bushels, value $23,400; beans 350 acres, acre yield 12, production 4,200 bushels, value $12,600; all tame hay 9,000 acres, acre yield 3.3, production 29,700 tons, value $249,480; wild hay 4,000 acres, acre yield 1.4, production 5,600 tons, value $42,000.

Livestock: Livestock products marketed in 1927 totaled $501,400. Combined crops and livestock were valued at $2,273,940.

Value of Industries: The estimated value of manufacturing in 1927 was $200,000 and tourist $95,000.

Total and Per Capita Production: The total production for the county is valued at $2,568,940, and Golden Valley took ninth place in per capita production for 1927 at $964.

The total assessed valuation of the county in 1927 was $10,470,583, with real estate and improvements valued at $6,382,000, livestock at $503,000 and public utilities at $3,216,000. The taxable value of all property was $3,516,791.

The tax rate for county purposes last year was 34.5 mills on the taxable valuation, and the average school levy was 20.94 mills. The average general tax for all purposes was 15.1 cents an acre on farm and grazing lands, 47 cents a head on horses, 60.3 cents a head on cattle and 18 cents a head on sheep.

The county net debt June 30, 1924, amounted to $578,100.33. By June 30, 1927 this had been reduced to $470,818.28, a cut of more than $100,000. School districts also did well in the matter of debt reduction, their net debt totalling $93,321.34 June 30, 1927 as compared with $128,123.82 in 1924. The net debt per capita for county and school purposes was $131.94 June 30, 1927.

Additional Information: For more detailed information about the resources of Golden Valley county, write the State Publicity Division, Helena, Montana.

PETROLEUM COUNTY

Date of Creation	Feb. 22, 1925	Est. County Population Jan. 1, 1928	2,176
Land Area	1,686 sq. miles	Population County Seat	600
County Seat	Winnett	Altitude County Seat	2,900 feet
Growing Season	April 1 to October 1		

By Ella V. Millsap.

CREATED from the eastern portion of Fergus county, Petroleum is the newest addition to Montana's fifty-six counties. The surface of the land is generally rolling with valleys and benches.

Soil: Sandy loam and gumbo.

Crops: Alfalfa, corn, wheat, oats, flax, alfalfa seed, rye, and all garden vegetables.

Drainage and Water Supply: Flatwillow Creek, McDonald, Elk, Yellow Water, Cat Creek, Brush, Dovetail, Dry Blood, Drag Pike, Buffalo, and Musselshell River.

Industries: Farming, stock raising, and oil. There are four grain elevators located at Winnett, also three small sawmills in the county.

Mineral Resources: The mineral resources of the county consist principally of oil. The Cat Creek field, one of the first oil fields to be developed in the state, is located near Winnett.

Timber: Pine and cedar along Musselshell and Missouri Rivers.

Land Values: Irrigated land sells at $25 to $50 an acre; tillable land at $15 to $20, and grazing land $3 to $5.

Transportation and Highways: The Chicago, Milwaukee, St. Paul & Pacific Railway. The

Central Montana Highway and the Custer Battlefield Highway.

Education: There are 30 schools in the county, including a high school. The total enrollment is 589.

Cities and Towns: Winnett, the county seat, is the largest town in the county. Other towns are Cat Creek, Valentine and Flatwillow.

Climatological: According to the weather bureau station at Flatwillow, the average temperature is 43.3 degrees and the average annual precipitation is 12.9 inches.

Crop Production: The value of all crops in Petroleum county totaled $187,890, divided as follows: Spring wheat 11,000 acres, acre yield 17, production 187,000 bushels, value $181,390; potatoes 100 acres, acre yield 100, production 10,000 bushels, value $6,500.

Livestock: Livestock products marketed in 1927 totaled $614,300. Combined crops and livestock were valued at $802,190.

Value of Industries: Manufacturing is valued at $125,000. Petroleum county placed second in production of oil, with a total of $1,046,930. The tourist trade was valued at $95,000.

Total and Per Capita Production: Total production for the county is valued at $2,069,120 and per capita for 1927 at $951.

Assessment figures of 1927 show real estate and improvements valued at $7,492,493, livestock valued at $472,281, public utilities at $342,273, and net proceeds of oil wells at $1,854,409. The total value of all property was $10,820,339, with a taxable value of $4,584,947.

The tax rate for county purposes last year was 26 mills on the taxable valuation, and the average rate for school purposes was 17.38 mills. The general tax for all purposes averaged 12.5 cents an acre on farm and grazing lands, 26.7 cents a head on horses, 46.9 cents a head on cattle and 16.7 cents a head on sheep. These amounts are all below the average for the state.

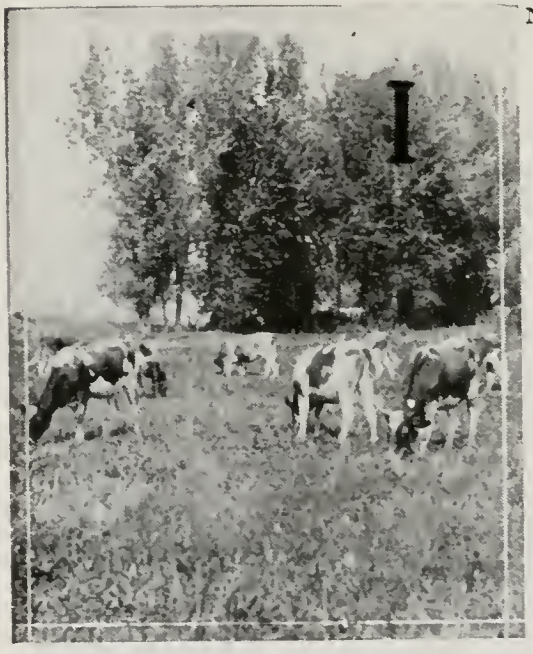
The net debt of the county was reduced from $203,770.83 to $171,358.71 during the year ended June 30, 1927, and the net debt of district schools decreased about $10,000 during the same period. The total debt for county and school purposes was $227,975.41 June 30. 1927.

Additional Information: For more detailed information about the resources of Petroleum county write to Ella V. Millsap, County Clerk or the Secretary of the Commercial Club, Winnett, Montana.

JUDITH BASIN COUNTY

Date of Creation	Dec. 10, 1920	Est. County Population Jan. 1, 1928	4,342
Land Area	1,869 sq. miles	Altitude County Seat	4,200 feet
County Seat	Stanford	Growing Season	114 days

By Charles R. Mountjoy



INCLUDING within its area the great Judith Basin, recognized as the best non-irrigated district in the state, Judith Basin county has rapidly won prominence as an agricultural county. It is situated in central Montana, with a maximum length of 70 miles and breadth of 50 miles approximately. The crest of the Little Belt Montain range defines its southern and western boundary and the Highwood Mountains the north and west. Fergus county lies to the east.

Surface and Soil: The land adjacent to the two mountain ranges is rough and broken and several creeks drain the county to the north and east. The chief agricultural regions are found in the eastern and northern two-thirds of the county. The soil is a dark or chocolate colored clay loam, underlaid with clay and gravel. The soil and subsoil are well mixed with lime.

Crops: Spring wheat is the leading cash crop with winter wheat next in value. Oats and barley are also grown extensively for feed crops while flax and rye are grown on a small scale. All small grain crops do well. The bottom lands produce excellent crops of alfalfa and grass hays. Garden and root crops do well.

Drainage and Water Supply: The Judith River, in the eastern half of the county, is the largest stream in the county, but numerous mountain streams all flowing north, traverse the county. Springs are found in many districts, and wells can be obtained at depths ranging from 15 to 75 feet.

Industries: Agriculture and stock raising are the chief industries with grain crops producing approximately 60% of the county agricultural income and livestock 40%. There are two flour mills in the county.

Minerals: Large coal deposits exist in the county, but the main operation is at Lehigh. Mining for gold, silver, and copper is being done on a small scale. The sapphire production of the county averages about $200,000 a year. The output, however, is regulated by the market demand.

Timber: About one-fifth the area of the county is included within national forests.

Land Values: Grain lands range in price from $40 to $75 an acre. Stock ranches and diversified farms can be purchased at $20 to $40 an acre.

Transportation and Highways: The Billings-Shelby line of the Great Northern, used by the Burlington for its transcontinental trains, runs northwesterly through the heart of the agricultural districts, and is paralleled by the Custer Battlefield Highway. Other highways connect the county with Lewistown, Great Falls and points south.

Education: There are 59 schools in the county, including six high schools. The total enrollment is 1,400.

Cities and Towns: Stanford, the county seat, is the largest town in the county. Others are Hobson, Moccasin, Windham, Geyser, Benchland, Kolin, Utica, Merino, Raynesford, Spion Kop, Arrow Creek, and Dover.

Climatological: The average rainfall for the county is approximately 17 inches, coming chiefly in May, June, and early July. Cold spells of winter are broken by chinooks so that grazing livestock is possible a large share of the winter.

Crop Production: The value of all crops in Judith Basin county totaled $4,014,130, divided as follows: Spring wheat, 100,000 acres, acre yield 23, production 2,300,000 bushels, value $2,231,000; winter wheat 42,000 acres, acre yield 20, production 840,000 bushels, value $772,800; all wheat 142,000 acres, acre yield 22.1, production 3,140,000 bushels, value $3,003,800; oats 8,000 acres, acre yield 39, production 312,000 bushels, value $137,280; barley 6,000 acres, acre yield 35, production 210,000 bushels, value $126,000; rye 2,500 acres, acre yield 20, production 50,000 bushels, value $36,500; flaxseed 100 acres, acre yield 9.7, production 1,000 bushels, value $1,750; corn 1,000 acres, acre yield 20, production 20,000 bushels, value $14,400; potatoes 600 acres, acre yield 120, production 72,000 bushels, value $46,800; all tame hay 35,000 acres, acre yield 1.7, production 59,500 tons, value $499,800; wild hay 16,300 acres, acre yield 1.2, production 19,600 tons, value $147,000; truck crops and vegetables, $800.

Livestock: Livestock products marketed in 1927 totaled $1,386,500. Combined crops and livestock are valued at $5,400,630.

Value of Industries: The estimated value of manufacturing in 1927 is $200,000. In metal mining Judith Basin placed seventh with a total of $250,000. Lumbering is valued at $32,085 (includes value of lumber cut only. Value added by manufacturing not included) and tourist at $171,000.

Total and Per Capita Production: The total production for the county is valued at $6,053,715. In per capita production the county placed third, with $1,394.

The assessed value of real estate and improvements in 1927 was $17,045,987, livestock, $1,485,904 and public utilities $4,428,260. The total value of all property was $24,549,921, with a taxable value of $7,781,414.

The county tax rate of 23.5 mills on taxable valuation last year was close to the state average. The average school rate of 20.95 mills was considerable below the state average. Taxes for all general purposes average 27.4 cents an acre on farm and grazing lands 48.4 cents a head on horses, 57.3 cents a head on cattle and 16 cents a head on sheep.

The county net debt dropped from $340,865.99 June 30, 1924, to $264,947.21 June 30, 1927. On the latter date the net indebtedness of school districts amounted to only $90,036.34, making the per capita net debt for county and school purposes $82.88, June 30, 1927.

The county agent is located at Stanford.

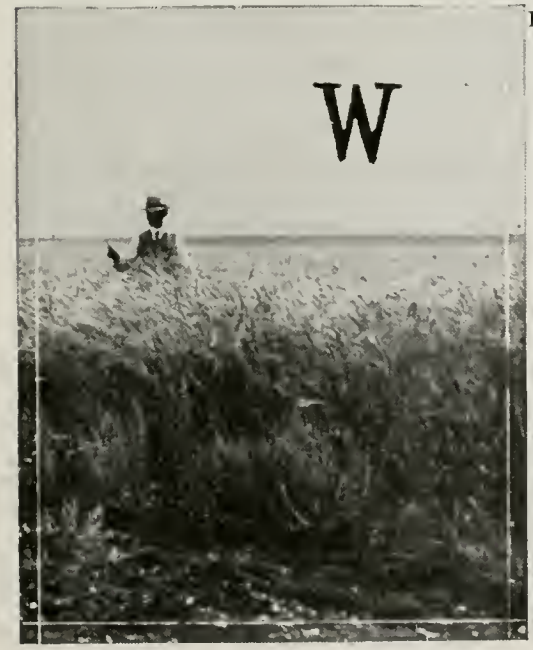
Additional Information: For additional information about the resources of Judith Basin county, write to the County Agent, Stanford, or the Community Club, Windham, Montana.

CASCADE COUNTY

Date of Creation	Dec. 1887	Altitude County Seat	3,300 feet
Land Area	2,722 sq. miles	Est. County Population Jan. 1, 1928	39,384
County Seat	Great Falls	Population County Seat 1920	24,124

Growing Season, average.....138 days

By Reyn Leedom.



WHAT is now known as Cascade county, has developed around the waterpower resources of the Great Falls of the Missouri, which furnish potential power capable of 365,000 horsepower energy, of which 165,000 horsepower have been developed to date. The county is about 60 miles long and 50 miles wide. The extreme southern portion which is mountainous and timbered, is devoted to livestock raising, small grain farming, and silver, lead and coal mining. The central portion, being of rolling plains and river valley, is devoted to irrigated and non-irrigated farming, dairying, poultry raising, livestock growing, and bituminous coal mining.

Surface and Soil: The surface of the county is in the main, rolling plains and river valley. The soil varies from that of black sandy loam to heavy black loam with a clay subsoil. Some chocolate loam is found in the foothills areas.

Crops: To the north and east and southeast of the county seat lies an extensive non-irrigated section, the principal crop of which is spring wheat; livestock and forage crops holding important places on list of products. To the southwest, west and northwest is the irrigated section, where farming is highly diversified, the major crops being wheat, oats, barley, potatoes, alfalfa and other forage crops, and sugar beets.

Livestock raising on a small scale (cattle, sheep and swine), is a part of the program on farms in both irrigated and non-irrigated areas.

Drainage and Water Supply: The Missouri River, flowing diagonally through the county, with a total fall of more than 350 feet in Cascade county, furnishes an abundance of waterpower. The tributaries of the Missouri make available irrigation facilities unexcelled. Flowing from the north and west, with its source in the main range of Rocky mountains, and having its conflux with the Missouri at Great Falls, is Sun River. Other tributaries traversing the county, are Dearborn and Smith Rivers and Belt creek, all of which originate in the main range of the Rockies; while among the smaller creeks of importance are Highwood, Hound, Sheep, and Willow creeks. Adjacent to these waterways are fertile valleys and benches and irrigable areas. The Sun River reclamation project and several private irrigation enterprises, furnish irrigation waters for approximately 60,000 acres. The Gibson dam, now in the course of construction will stabilize the water supply for a total of 100,000 acres in what are known as the Sun River Valley and Greenfields Bench. This dam has its site in the upper Sun River canyon of the Rocky Mountains, and will be completed in 1929 at an estimated cost of $3,000,000.

Industries: While Cascade county ranks high in crop and livestock production, it possesses natural resources which place it in the lead of all other counties in value of manufactured products. Among these are dairy products, flour, cereals, meat products, drugs, soft drinks, ice, ice cream products, candy, vinegar, toilet articles, refrigerators, cigars, furniture, auto bodies, carpets, harness goods, shoes, engravings, castings, springs, lamp posts, sheet metal, wire, cable, copper, zinc, ferro-manganese, piston rings, brick and tile, gas, oil (fuel, lubricating, and other kinds, including gasoline and kerosene, distillate, etc.), machinery, monuments and carved stone, furs and fur garments. The largest oil refinery in Montana is located at Great Falls, which also boasts of the largest meat packing plant between the Twin Cities and Spokane. Great Falls also has the largest combined non-ferrous metal reduction plant in the world and the largest copper wire mill west of the Mississippi River. Recent additions to the Anaconda Copper Mining Company's plant make it the largest plant of its kind in the world. This company now employs more than 2,200 men.

Great Falls has seven principal industries which create an annual payroll of $7,500,000; and there are a total of seventy-four minor industries, employing from two to twenty-five men each.

Mineral Resources: Cascade county is rich in mineral resources, having within its area vast deposits of coal and iron, of which small portions of the coal fields have been developed. There are also immense deposits of silver and lead, with a large lead mining company now located at Hughesville, opening up this year the fabulously wealthy lead veins of that district.

Timber: The mountainous sections to the south, southwest and west are heavily timbered. These are natural forests. This timber is not cut for commercial purposes, but is available for domestic uses, such as timbers and posts, and general farm use. These forest areas are heavily grassed and are devoted exclusively to livestock growing.

Land Values: Stock and grazing lands and lands in the non-irrigated sections vary in price from $10 to $50 per acre. Lands in the irrigated areas vary in valuation from $50 to $150 an acre, contingent upon the nature and extent of improvements.

Transportation and Highways: The county seat of Cascade county is the commercial, distributing and financial center of central and northern Montana, and it has transportation facilities equal to any center of the state. Great Falls is terminal and divisional point for the Great Northern, the Chicago, Milwaukee, St. Paul & Pacific and Burlington lines, and has ten trunk and branch lines of these systems radiating into the adjacent territory, with 26 passenger trains in and out daily. Burlington trains operate over the Great Northern tracks through to Kansas City on the south and to Shelby on the north, connecting with through Great Northern trains to Seattle and Pacific coast points. Seven national highways through Great Falls afford ample routes for automobile tourist traffic. The Y-G Bee Line connects Yellowstone and Glacier National parks, passing through Great Falls. Great Falls is the northern terminus of the air mail and passenger line between that city and Salt Lake City, Utah, a distance of 600 miles.

Education: There are six high schools and 116 grade schools having a total enrollment of more than 9,500. A new $1,000,000 high school building is now in the course of erection in Great Falls.

Cities and Towns: Great Falls, the principal city of northern Montana, has 35 miles of street and alley pavements, 20 miles of boulevards, 25 miles of street railway, 725 acres of parks and playgrounds, a half a million dollar municipally-owned water system, a public natatorium, 27 churches and a public market. Natural gas from the Kevin-Sunburst oil and gas field, eighty miles north is being piped into the city, and work has been started on the construction of a Northern Montana Fair Grounds, at an estimated ultimate expenditure of $250,000. The largest towns in the county are Cascade, Belt, Stockett, Neihart, Monarch, Simms, Sun River and Fort Shaw.

Climatological: The average rainfall is 15.5 inches per annum.

Crop Production: The value of all crops in Cascade county in 1927 totaled $4,575,390, divided as follows: Spring wheat 68,000 acres, acre yield 25, production 1,700,000 bushels, value $1,649,000; winter wheat 54,000 acres, acre yield 23, production 1,242,000 bushels, value $1,142,640; all wheat 122,000 acres, acre yield 24.1, production 2,942,000 bushels, value $2,791,640; oats 13,000 acres, acre yield 36, production 468,000 bushels, value $205,920; barley 3,900 acres, acre yield 25, production 97,500 bushels, value $58,500; rye 4,000 acres, acre yield 16, production 64,000 bushels, value $46,720; flaxseed 400 acres, acre yield 10, production 4,000 bushels, value $7,000; corn 5,000 acres, acre yield 25, production 125,000 bushels, value $90,000; potatoes 1,400 acres, acre yield 135, production 189,000 bushels, value $122,850; beans 400 acres, acre yield 10, production 4,000 bushels, value $12,000; seed peas 50 acres, acre yield 22, production 1,100 bushels, value $2,310; clover seed 800 acres, acre yield 5, production 4,000 bushels, value $60,000; all tame hay 58,000 acres, acre yield 2.1, production 121,800 tons, value $1,023,120; wild hay 14,800 acres, acre yield 1.2, production 17,800 tons, value $133,500; apples 100 bushels, value $130; truck crops and

vegetables $9,800, and sugar beets 200 acres, acre yield 7, production 1,400 tons, value $11,900.

Livestock: Livestock products marketed in 1927 totaled $2,430,800. Combined crops and livestock were $7,006,190.

Value of Industries: Cascade county ranks second in the value of all industries with a total of $17,142,452, as follows: Manufacturing $8,395,000; metal mining $650,000; lumbering $10,230 (includes value of lumber cut only. Value added by manufacture not included); coal mining $506,032 and tourist $575,000.

Total and Per Capita Production: The total production for the county is valued at $17,142,452 and per capita production for 1927 at $435.

Cascade county has a county extension agent located at Great Falls.

The total value of all property in the county, as listed for assessment purposes in 1927, was $109,137,392. Real estate and improvements were assessed at $75,239,000, livestock at $2,095,000, and public utilities, as allocated by the state board of equalization, at $9,301,000. Total taxable value of all property was $32,778,703.

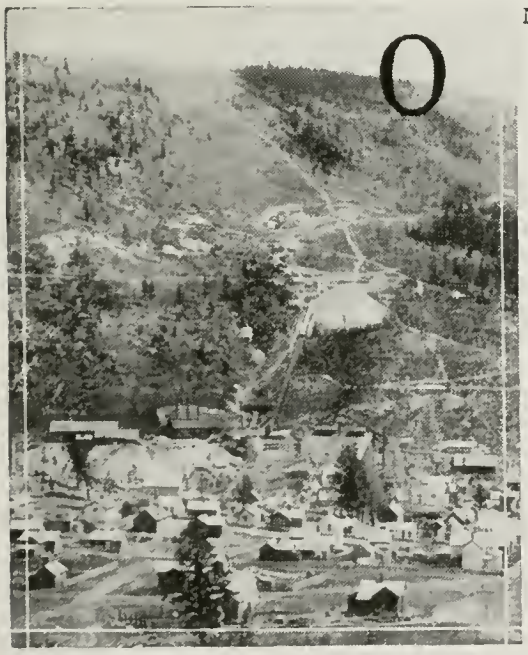
Tax levies for county and school purposes are below averages for the state. The county rate last year was 20 mills on taxable valuations, and the average school rate was 21.5 mills. Taxes averaged 21 cents an acre on farm and grazing lands, 47.8 cents a head on horses, 52 cents a head on cattle and 13.4 cents a head on sheep.

The net county debt June 30, 1924, amounted to $1,561,399.77. June 30, 1927, it was $1,248,726.52, a decrease of $312,673.25, or more than 20 per cent during the three years. School districts made even a better showing, cutting their combined net debt from $438,675.97 to $306,478.25, more than 30 per cent, during the same period. Based on a conservative estimate of population, the per capita net debt for county and school purposes June 30, 1927, was $37.93, approximately $22 less than the average throughout the state.

Additional Information: For more detailed information about the resources of Cascade county, write the Chamber of Commerce, Great Falls, or the Commercial Club, Cascade, Montana.

JEFFERSON COUNTY

Date of Creation	Feb. 2, 1865	Est. County Population Jan. 1, 1928	4,569
Land Area	1,637 sq. miles	County Population 1920	5,203
County Seat	Boulder	Population County Seat	461
Altitude of County Seat	4,919 feet	Growing Season	82-121 days



ONE of the original counties of the Territory of Montana, Jefferson county was also one of the largest producers of metal in the 80's and boasted the largest mining pay-roll in the state. Approximately 60 miles long north and south by 40 miles wide, the elevations range from 4,100 feet in the Jefferson Valley at the southern end to 4,919 at Boulder in the Boulder Valley and upwards to 7,000 feet in the mountain ranges. The large areas of mountainous country make it particularly adapted to stock raising. The tillable area which is largely confined to the valleys is small, the principal crops being hay and grains, although vegetables of all kinds are successfully grown. In the irrigated districts around Whitehall, farmers have specialized in potatoes and dairying.

Soil: The soil of the county is alluvial and rich.

Crops: Wheat is the principal crop, with hay a close second. Oats, barley, rye, potatoes, seed peas, fruits and all varieties of vegetables are successfully grown.

Drainage and Water Supply: The Jefferson River flowing along the southeastern border, is the largest stream; the next largest is the Boulder River, rising in the northern part of the county and flowing southerly, emptying into the Jefferson at Cardwell. There are numerous smaller streams.

Industries: As in the earlier days, mining will still continue to be one of the chief industries of the county, the silver-lead mines at Wickes, Corbin, Gregory, Elkhorn and the Cataract district having produced many millions of dollars. At Basin is one of the richest gold mines in the state and in the Upland district are found rich silver mines. At the present time mining activity is confined to Basin, the territory adjacent to Wickes, and at Corbin where a small concentrator is operating. For the past twenty years economic conditions have caused a marked depression in the mining industry, but it is confidently expected that the near future will mark the beginning of a new era in the mining world. Much livestock is ranged on the national forest, while agriculture and dairying are making steady progress.

Mineral Resources: Although the mineral production in the past has been enormous, it is the consensus of opinion that many of the larger mining properties are as yet untouched. The chief metals are gold, silver, lead, copper, some zinc, also manganese, platinum, gems, fire clay, limestone and granite for building purposes. The wings of the State Capitol at Helena are constructed of Jefferson county granite.

Timber: There is considerable merchantable timber, 354,720 acres of the Deer

Lodge National Forest and 147,835 acres of the Helena National Forest being included within the county.

Land Values: The price of irrigated land ranges from $30 to $125 an acre; non-irrigated land from $8 to $25 an acre and grazing land from $5 to $10 an acre.

Education: There are 35 schools, including two high schools, with a total enrollment of 919. The State School for the Deaf and Blind and for the Feeble Minded is located at Boulder.

Transportation and Highways: The main lines of the Chicago, Milwaukee, St. Paul and Pacific and the Northern Pacific cross the southern end of the county, the Butte-Havre branch of the Great Northern runs northerly through the western part of the county. Transcontinental and north and south highways parallel the railroads.

Crop Production: The total value of all crops produced in Jefferson county in 1927 was $999,240, divided as follows: Spring wheat 9,000 acres, acre yield 23, production 207,000 bushels, value $200,790; winter wheat 5,000 acres, acre yield 21, production 110,000 bushels, value $101,200; all wheat 14,000 acres, acre yield 22.6, production 317,000 bushels, value $301,990; oats 2,000 acres, acre yield 38, production 56,000 bushels, value $24,640 barley 2,200 acres, acre yield 40, production 88,000 bushels, value $52,800; rye 3,800 acres, acre yield 20, production 76,000 bushels, value $55,480; potatoes 800 acres, acre yield 145, production 116,000 bushels, value $75,400; seed peas 300 acres, acre yield 21, production 6,300 bushels, value $13,230, all tame hay 13,000 acres, acre yield 2.2, production 28,600 tons, value $240,240; wild hay 14,900 acres, acre yield 2.0, production 29,800 tons, value $223,500; apples 1,200 bushels, value $1,560; truck crops and vegetables $9,700; miscellaneous fruits $700.

Livestock: The total value of livestock products marketed in 1927 was $425,600. Combined crops and livestock were valued at $1,424,840.

Value of Industries: The estimated value of manufacturing was $115,000. In metal mine production Jefferson tied fourth place with Fergus county, with a total of $400,000. Lumbering was $35,340 (includes value of lumber cut only. Value added by manufacturing not included), and tourist $153,000.

Total and Per Capita Production: The total production for the county is valued at $2,128,180 and per capita for 1927 at $466.

All property in the county had a value of $13,757,743 for assessment purposes in 1927. Real estate and improvements were valued at $4,454,497, livestock at $618,588 and public utilities at $7,595,779. The total taxable value of all property was $5,003,143.

Taxes are low, the county levy of 20.75 mills on taxable valuations, and the average school levy of 22.89 mills both being below averages throughout the state. Taxes last year averaged 9.6 cents an acre on farm and grazing lands, 41.6 cents a head on horses, 59.5 cents a head on cattle and 16.8 cents a head on sheep.

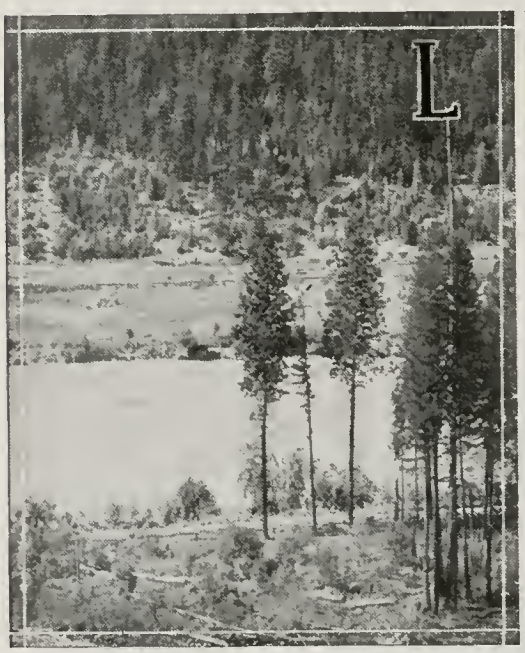
The county indebtedness, net, amounted to $111,787.15 June 30, 1924. June 30, 1927, it was $73,276.23, a reduction of more than 34 per cent. Net indebtedness of school districts has increased slightly, such debt amounting to $107,350.10 June 30, 1927, as compared with $97,710.34 June 30, 1924. The net debt per capita for county and school purposes was $34.71, about $25 less than the state average, June 30, 1927.

Additional Information: For more detailed information about the resources of Jefferson county, write to the state publicity division, Helena, Montana.

LEWIS AND CLARK COUNTY

Date of Creation.....	.....Nov. 21, 1867	Est. County Population Jan. 1, 1928....	18,384
Land Area.....	.....3,478 sq. miles	Population 1920.....	18,528
County Seat.....	.....Helena	Population County Seat.....	12,087
Altitude County Seat.....	.....4,110 feet	Growing Season.....	142 days

By W. G. Ferguson



LEWIS and Clark county attracted its first settlers by reason of its rich placer gold deposits. For years mining was the principal industry of the county, but livestock raising and agriculture began to come into their own and today have outstripped the mining industry in the amount of wealth produced yearly. Mining today shows greater promise than for years past, but agricultural developments are more than keeping pace, and with more intensive cultivation of the farming lands the value of crops and livestock produced is showing a yearly increase. The county is rich in mineral wealth, with its mountains sheltering large valleys well adapted to agriculture and stock raising. Some of the largest sheep companies in Montana are located in Lewis and Clark county, as the large amount of public lands offers the range necessary for their operations. Cattle and horses are usually found in smaller herds ranging from 200 to 400. There is a large amount of irrigated and non-irrigated land in this county on which remarkable bargains are offered. Many state and federal institutions and offices are located in Helena. United States Veterans' Bureau, Veterans' Hospital No. 72, Regional office, Internal Revenue office and practically every branch of the federal government has an office in this city. The State Capitol is located in Helena, These federal and state pay rolls give a firm foundation to business conditions.

Surface and Soil: The mountainous topography of Lewis and Clark county carries a wide variation of soils. Both non-irrigated and irrigated lands are typified by soils according to location. The fertile irrigated valleys over the county have soils made up largely of sandy and silty loams. The gumbo type of soils are lacking in all of the valleys. The irrigated bench lands are largely made up of soil types characteristic of the non-irrigated sections. The non-irrigated lands of the county are made up of the clay loam type of soil and are characterized for their moisture holding faculties. The sub-surface soils over the county vary from a heavy hardpan type to more porous gravelly texture.

Crops: Peas, beans, potatoes, alfalfa, small grains, corn, and all root crops do exceptionally well. Much of the land is suited to sugar beets and this industry is developing rapidly. Some of the largest poultry farms in the State are situated in this county. Turkey raising is proving a profitable industry. Near Helena there are many truck and dairy farms making good returns to the owners. Hogs are doing exceptionally well.

Drainage and Water Supply: The Missouri River flows northerly through the county and many good-sized tributaries whose source is in the Continental Divide and Big Belt Mountains flow into it. Three large plants are located on the Missouri River. The county ranks second in the State in developed hydro-electric power. The tributaries of the Missouri supply a large amount of the irrigation water for the county.

Industries: Smeltering and refining and its allied industries play a big part in the industrial life of the county. The largest lead smelter in the United States is located at East Helena. Mining is showing greater promise than for a decade past. A new smelter is being planned and many properties being opened up. There are a number of smaller industries in the county.

Mineral Resources: The Helena district is highly mineralized and has produced several hundred millions of wealth since its inception. The year 1927 marked the beginning of a new era in mining in this district. The development work of the Montana-Idaho company, the New Gould and Golden Messenger companies was outstanding and all of these properties seem to be assured dividend payers. Much new development is expected this year as the result of the activity of these companies.

Timber: A large part of the timber of the county is located within the Helena National Forest. This supplies practically an inexhaustible amount of timber for farm needs.

Land Values: Land offers some remarkable values in Lewis and Clark county. Good irrigated agricultural land can be purchased around $75 an acre. Land carrying its own water right is valued at $100 or above. Non-irrigated land farms can be bought at around $25 an acre. There is a good opportunity to purchase productive farms at reasonable prices and terms.

Transportation and Highways: The Northern Pacific and Great Northern Railways afford splendid transportation facilities in every direction from Helena. Sixty-five per cent of the population of the State can be reached from here at the lowest distributing rate. The markets of Butte,. Great Falls, Missoula, Bozeman, and Livingston are within 125 miles of this city.

Education: Lewis and Clark county boasts of a splendid system of schools. There are 60 graded schools and three high schools in the county. The Intermountain Union College, St. Vincent Academy and Mount St. Charles College are situated in Helena, making it possible to educate children from the grades through college without sending them away from Helena.

Cities and Towns: Augusta, Gilman, Craig, Wolf Creek, Lincoln, Marysville, and Rimini are some of the principal towns in Lewis and Clark county. East Helena is the largest town outside of Helena. The smelter of the American Smelting & Refining Company is located there.

Climatological Conditions: Lewis and Clark county has an ideal mountain climate. The government has located its hospital for tuberculars at Helena, indicating its satisfaction with weather conditions prevailing here.

Crop Production: Lewis and Clark county placed fourth in the state in production of potatoes and eighth in production of tame hay. The total value of all crops was $1,695,870, divided as follows: Spring wheat 14,000 acres, acre yield 20, production 280,000 bushels, value $271,600; winter wheat 4,000 acres, acre yield 25, production 100,000 bushels, value $92,000; all wheat 18,000 acres, acre yield 21.1, production 380,000 bushels, value $363,600; oats 5,000 acres, acre yield 39, production 195,000 bushels, value $85,800; barley 2,200 acres, acre yield 34, production 74,800 bushels, value $44,880; rye 3,200 acres, acre yield 18, production 57,600 bushels, value $42,048; corn 1,000 acres, acre yield 20, production 20,000 bushels, value $14,400; potatoes 1,700 acres, acre yield 123.2, production 209,400 bushels, value $136,110; seed peas 375 acres, acre yield 21, production 7,900 bushels, value $16,590; all tame hay 34,000 acres, acre yield 2.7, production 91,800 tons, value $771,120; wild hay 28,400 acres, acre yield 1.0, production 28,400 tons, value $213,000; apples 200 bushels, value $260; truck crops and vegetables $5,300; sugar beets 50 acres, acre yield 6.3, production 325 bushels, value $2,762.

Livestock: Livestock products marketed in 1927 are valued at $1,648,700, placing Lewis and Clark county tenth in the state. Combined crops and livestock totaled $3,344,570.

Value of Industries: In the estimated value of manufacturing Lewis and Clark placed third with a total of $7,000,000. In metal mining the county placed sixth with a total of $279,000 and the estimated value of the tourist trade was $270,000.

Total and Per Capita Production: In county production Lewis and Clark placed fifth with a total of $10,980,060 and per capita production for 1927 was $597.

Lewis and Clark's valuation for assessment purposes in 1927 was $58,852,895. Real estate, with improvements was assessed at $24,045,259, and livestock at $1,681,715. Public utility allocations by the state board of equalization totaled $5,863,994. Taxable value of all property was $16,926,491.

The county tax rate of 22.5 mills on taxable valuation, and the average school rate of 23,26 mills, are both close to the state average. The tax for all general purposes averaged

11.3 cents an acre on farm and grazing lands, 55.3 cents a head on horses, 64.2 cents a head on cattle, and 16.5 cents a head on sheep.

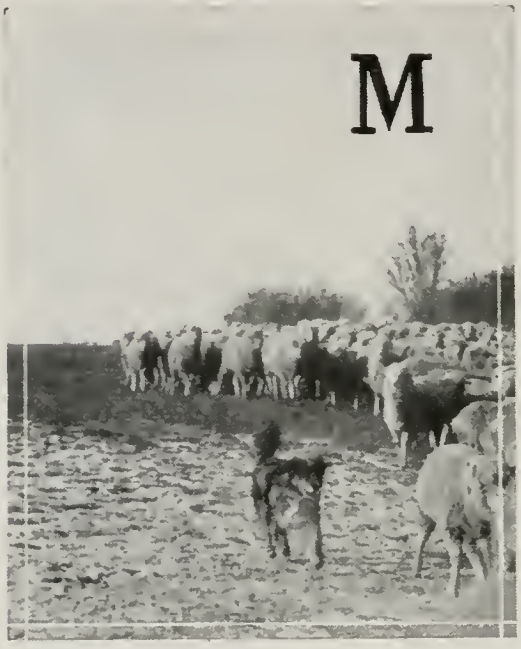
June 30, 1924, the county debt amounted to $557,310. June 30, 1927, it was $414,976.38, a reduction of more than 25 per cent in the three years. During the same period the total net indebtedness of school districts decreased from $608,895.80 to $586,946.65. Based on the 1920 census, the per capita net debt for county and school purposes was $53.70, slightly below the state average, June 30, 1927.

The county agent and home demonstration agent are located at Helena.

Additional Information: For more detailed information about the resources of Lewis and Clark county, write to the secretary of the Commercial Club at Helena, or the secretary of the Commercial Club at East Helena, Montana.

MEAGHER COUNTY

Date of Creation.....Nov. 16, 1867
Land Area.....2,412 square miles
County Seat.....White Sulphur Springs
Altitude of County Seat.....5,280 feet
Est. County Population Jan. 1, 1928.....2,209
County Population 1920.....2,622
Population of County Seat..... 575
Growing Season.....April to September



MEAGHER county is situated in the central part of Montana, with the Little Belt range of mountains marking its northern boundary and the crest of the Big Belt Mountains its southern boundary. The Smith River flows northwesterly through the county, and its valley is the principal one there.

Surface and Soil. A little more than half of the county is mountainous. The Smith River valley which is 50 miles long and from 12 to 15 miles wide is practically all irrigated and is the chief farming district. In the eastern end of the county there is some non-irrigated farming. The soil in the valleys is alluvial, and on the benches it is a chocolate loam.

Crops: Wheat, oats and barley are characteristic crops as are verified by the numerous prizes received in state competitions. Alfalfa is the principal forage crop under irrigation.

Drainage and Water Supply: Meagher is an exceedingly well watered county. Sixteen Mile creek, rising in the Castle Mountains, flows west through a canyon into the Missouri at Lombard. Many other streams rising in the mountain ranges on the northern and southern sides of the county flow into the Smith River.

Industries: Farming, stock raising, dairying and mining form the chief industries. Wheat growing is attractive on account of the high percentage of gluten. Springs Creamery, the output of which is in demand both in Butte and Helena, receives shipments of cream from the entire county. The springs after which White Sulphur Springs, the county seat, is named, are said to be highly medicinal and attract many people from other parts of the state.

Mineral Resources Iron, lead and copper comprise the minerals. At present the iron mining is being developed by eastern interests. A great deal of activity is contemplated during 1928.

Timber: Owing to the vast acreage contained in the National Forests, excellent stands of timber are found in the county. The National Forests which comprise 624,910 acres are divided as follows: 77,722 acres in the Absaroka Forest, 1,065 in the Gallatin Forest, 133,489 acres in the Helena, and 413,634 acres in the Jefferson Forest.

Land Values: There are some bargains in land; good irrigated lands may be had from $40 to $50 per acre, while grazing land is available at from $5.00 to $7.50 per acre.

Transportation and Highways: The main line of the Chicago, Milwaukee, St. Paul and Pacific Railway traverses the southern part of the county, and a branch line from Ringling runs to White Sulphur Springs, 18 miles north. The National Park-to-Park Highway and the Electric Highway traverse the county also.

Education: There are 26 schools having an enrollment of 459. The county high school and a newly built grade school are located at White Sulphur Springs.

Cities and Towns: White Sulphur Springs, the county seat, is the only town of importance. It is well built and modern. Ringling is a shipping and distributing point for a considerable area.

Climatological: According to the weather bureau station at White Sulphur Springs, the average temperature is 40.5 degrees and the average annual precipitation is 12.37 inches. Observations of 14 years record a frost-free period of 94 days.

Crop Production: The value of all crops produced in Meagher county in 1927 totaled $1,028,082, divided as follows: Spring wheat 6,000 acres, acre yield 18, production 108,000 bushels, value $104,760; winter wheat 1,000 acres, acre yield 25, production 25,000 bushels, value $23,000; all wheat 7,000 acres, acre yield 19, production 133,000 bushels, value $127,760; oats 3,000 acres, acre yield 40, production 120,000 bushels, value $52,800; barley 3,200 acres, acre yield 35, production 112,000 bushels, value $67,200; rye 300 acres, acre yield 23, production 6,900 bushels, value $5,037; flaxseed 300 acres, acre yield 10, production 3,000

bushels, value $5,250; potatoes 500 acres, acre yield 125, production 62,500 bushels, value $40,625; all tame hay 28,000 acres, acre yield 2.3, production 64,400 tons, value $540,960; wild hay 21,700 acres, acre yield 1.1, production 23,900 tons, value $179,250; truck crops and vegetables $9,200.

Livestock: Livestock products marketed in 1927 totaled $1,068,600. Combined crops and livestock were valued at $2,096 682.

Value of Industries: The estimated value of manufacturing was $122,000. Lumbering was valued at $45,570 (includes value of lumber cut only; value added by manufacture not included), and tourist $185,000.

Total and Per Capita Production: The total production for Meagher county was $2,439,252 and in per capita production for 1927 the county tied for fifth place with Liberty with a total of $1,104.

Meagher's real estate and improvements were assessed in 1927 at $8,129,500, livestock at $1,805,500 and public utilities at $2,719,600. The total value of all property was $13,742,608, with a taxable value of $4,440,854.

Tax levies are considerably below the state average. The county rate last year was 21.5 mills and the average school rate was 14.41 mills, the lowest in the state. The tax for all general purposes averaged 8.4 cents an acre on farm and grazing lands, 31.8 cents a head on horses, 42.9 cents a head on cattle and 12.2 cents a head on sheep.

The county's indebtedness, net, June 30, 1927, was $426,435.57, and the combined net debt of district schools was $97,238.42, making a total net debt for county and school purposes on that date of $523,673.99.

Additional Information: For more detailed information about the resources of Meagher county, write to the State Publicity Division, Helena, Montana.

BROADWATER COUNTY

Date of Creation	March 1, 1897	Est. County Population Jan. 1, 1928	2,637
Land Area	1,250 sq. miles	Population 1920	3,239
County Seat	Townsend	Population County Seat	1,200
Altitude of County Seat	3,800 feet	Growing Season	April to October

By R. N. Lodge.

AGRICULTURE is the chief industry of Broadwater county, which lies in Central Montana and is bordered on the west by the general Rocky Mountain Range and on the east by the Big Belt Mountains. The famous Missouri River and Valley reaches from the southern to the northern boundaries of the county, fifty miles in length, and abounds in wealth with its fertile irrigated and non-irrigated lands. The rolling foothills not only produce hundreds of thousands of bushels of choice Montana hard wheat and other grains, but afford abundance of pasture for the many herds of sheep and stock cattle. The Missouri river and many mountain streams furnish a never failing water supply and contribute to the desirability of the county's location.

Surface and Soil: The general lay of the agricultural land in the Missouri River Valley is level to slightly rolling, and then too, Nature favored the county with long gentle slopes from the rugged mountain ranges to the river. The soil is a rich black mountain ash loam and sandy loam, free from gumbo, with a lime content that assures permanent fertility and seems never to tire of producing.

Crops: Broadwater county is a leader in the production of choice alfalfa hay, wheat, oats, barley, potatoes and seed crops. Corn has been produced successfully; and small grains, vegetables and fruits are of the highest quality. Hay and pasture grass such as timothy, sweet clover, brome grass and blue joint are extensively raised and are exceptionally nutritious and fattening.

Drainage and Water Supply: The county is favored by natural drainage, a very small portion needing better drainage. The water supply is ample, mountain streams, springs and the Missouri river furnishing water for irrigation for the principal parts of the valley. An irrigation project to furnish water for the Crow Creek Valley has been surveyed by competent engineers and no doubt this summer will mark the beginning of actual work of construction.

Industries: The principal industries are agriculture and stock raising. There are four grain elevators, two located at Toston, and a flour mill, a creamery, two elevators and an ice cream plant at Townsend.

Mineral Resources: There are several large mining properties in the county, producing gold, silver, lead and galena. Marble, coal and granite deposits are as yet untouched. Some aluminum has also been found. Oil rigs are at present prospecting for petroleum in three widely separated sections in the county.

Timber: The timber area is approximately 185,000 acres of high grade native fir and yellow pine.

Land Values: Land values range in price from $60 to $100 an acre for irrigated land. Non-irrigated land brings from $15 to $30 an acre; meadow land from $20 to

$25 and grazing land from $4 to $6 an acre, the range in price being determined by the quality of the soil and the distance from the railroad.

Transportation and Highways: The Northern Pacific Railway crosses the county from north to south and the Chicago, Milwaukee, St. Paul and Pacific Railway passes through the southern end of the county. The Park-to-Park Highway, the Electric Highway and the White Trail cross the county, as does the main state east to west highway.

Education: There are 29 schools in the county, including one high school, with a total enrollment of 559.

Cities and Towns: Townsend, the county seat, is the largest and most modern town in Broadwater county. Other towns are Toston, Radersburg and Winston.

Climatological: The climate is ideal. The mountain ranges protect the valleys from the cold winds of winter; the summer days are cool and pleasant. The annual precipitation is 14 to 16 inches.

Crop Production: The value of all crops in Broadwater county in 1927 totaled $1,412,010 divided as follows: Spring wheat 13,000 acres, acre yield 27, production 351,000 bushels, value $340,470; winter wheat 11,000 acres, acre yield 20, production 220,000 bushels, value $202,400; all wheat 24,000 acres, acre yield 23.8, production 571,000 bushels, value $542,870; oats 7,000 acres, acre yield 50, production 350,000 bushels, value $154,000; barley 2,200 acres, acre yield 30, production 66,000 bushels, value $39,600; rye 800 acres, acre yield 20, production 16,000 bushels, value $11,680; potatoes 700 acres, acre yield 110, production 77,000 bushels, value $50,050; seed peas 100 acres, acre yield 21, production 2,100 bushels, value $4,410; all tame hay 18,000 acres, acre yield 3.3, production 59,400 tons, value $498,960; wild hay 9,500 acres, acre yield 1.5, production 14,200 tons, value $106,500; apples 1,800 bushels, value $2,340; truck crops and vegetables $900; miscellaneous fruits $700.

Livestock: Livestock products marketed in 1927 totaled $586,500. Combined crops and livestock totaled $1,998,510.

Value of Industries: The estimated value of manufacturing in 1927 was $218,000. Metal mining was valued at $71,000, lumbering $7,905 (includes value of lumber cut only. Value added by manufacture not included), and tourist $130,000.

Total and Per Capita Production: The total production for the county is valued at $2,425,415 and per capita production for 1927 at $920.

The total assessed valuation of the county in 1927 was $11,346,240. Real estate, with improvements, was valued at $6,161,915; livestock at $755,606, and public utilities at $3,583,241. The taxable value of all property was $3,754,528, and, with a county levy of 21.5 mills on the taxable valuation, and a levy for school purposes of 21.76 mills, taxes are not burdensome.

The average tax on farm and grazing land last year was 13.6 cents an acre; on horses, 49.7 cents a head; on cattle, 55.2 cents a head, and on sheep, 13.8 cents a head.

The net debt of the county June 30, 1924, was $203,379 17, June 30, 1927, it was $160,570.14, a reduction of $42,809.03, or 21.05 per cent. District schools made an even better showing during this period, reducing their net indebtedness from $117,025.75 to $67,281.91, or 42.5 per cent. The per capita net debt for county and school purposes dropped from $98.92 June 30, 1924, to $70,34 June 30, 1927.

Additional Information: For more detailed information about the resources of Broadwater county, write to the secretary of the Chamber of Commerce, Townsend, Montana.

FERGUS COUNTY

Date of Creation	Dec. 1, 1886	Est. County Population Jan. 1, 1928	18,000
Land Area	4,312 sq. miles	Population 1920	28,344
County Seat	Lewistown	Population of County Seat	6,500
Altitude of County Seat	3,960 feet	Growing Season	99-127 days

By H. L. Fitton.

IN the geographical center of the state, Fergus county as a real farming section has barely been scratched. For many years Fergus county was the largest in area in the United States, but during the last few years Judith Basin and Petroleum counties have been formed from this county. In spite of this reduction in area, Fergus county in 1927 took first place in the value of crops produced, and second place in value of all wheat.

Surface and Soil: The northern portions are more or less rolling uplands, broken by the Missouri River, which marks the northern boundary. The central and western areas are occupied by mountain ranges, isolated from the main range of the Rockies, considerable portions of which are included within national forests and can be utilized for grazing purposes. There is a large variation in soil types. In the eastern half of the county the prevaling type is a sandy loam underlain with a limestone gravel which is very fertile.

Crops: Winter wheat of a very high grade is grown here and, as a rule, does not winterkill and is, therefore, a safe and standard crop. Large crops of oats, barley, and rye are also grown. Corn is grown as a feed to some extent, but not commercially. Potatoes, beans, and sugar beets offer great opportunities for spe-

cialized farming. All garden crops do well in Fergus county. Timothy and alfalfa seed are also grown commercially.

Drainage and Water Supply: The county is well watered by streams and springs, while in some districts good artesian flows have been found.

Industries: Fergus county boasts two gypsum plants, oil refineries, flour mills, brick and tile plants, oil fields, coal fields, while agriculture and stock raising continue to be the chief industries.

Minerals: This county is rich in minerals, gold, silver, copper, lead, and iron having been discovered and produced in paying quantities. Coal of a good quality abounds and has a ready local market. Gypsum hills now keep two large plants at Hanover and Heath running full time, while alabaster, soap stone, brick and pottery clay, limestone, and sandstone await intensive development.

Timber: Aside from the timber on the national forests, pine, fir, and spruce are found on the mountain sides and cottonwoods and willows along the streams.

Land Values: Irrigated land is valued at $25 to $80 an acre and non-irrigated land at $5 to $40 an acre.

Transportation and Highways: A branch line of the Great Northern runs from Lewistown to Great Falls and also serves a rich farming district via Moccasin to Billings and the main line. The Chicago, Milwaukee, St. Paul & Pacific Railway and branch lines extend to the wheat centers of the county. The Custer Battlefield Hiway runs through Lewistown. The Dominion and Yellowstone Highway from Canada to the Yellowstone Park, the Central Montana Highway, and the National Parks Highways also traverse Fergus county.

Education: There are 138 schools in Fergus county, including seven high schools. The total enrollment is 4,462.

Cities and Towns: Lewistown, the county seat, is a modern little city of about 6,500 population. It has an up-to-date city and county high school, churches of all denominations, civic organizations, and is the distributing point and retail center for central Montana. Denton, Moore, and Grass Range rank next in size. Other towns are Garnell, Straw, Buffalo, Hanover, Hilger, Roy, Winifred, and Teigen.

Climatological: With an elevation of 3,000 to 4,500 feet, the winter season in Fergus is largely controlled by the prevailing Chinook winds. The snowfall is seldom more than six inches at any one time, and in the event of a Chinook, this melts very rapidly. The fall is very pleasant and long, winter seldom setting in before December. The summers are reasonably cool. In fact, Fergus has no extreme weather conditions.

Crop Production: In 1927 Fergus county ranked first in value of all crops produced, with a grand total of $7,183,870. Following are the figures for the various crops: Spring wheat, 180.000 acres, acre yield 20, production 3,600,000 bushels, value $3,492,000; winter wheat 63,000 acres, acre yield 24, production 1,512,000 bushels, value $1,391,040; all wheat 243,000 acres, acre yield 14.9, production 5,112,000 bushels, value $4,883,040; oats, 26,000 acres, acre yield 35, production 910,000 bushels, value $400,400; barley 7,900 acres, acre yield 32, production 252,800 bushels, value $151,680; rye 5,000 acres, acre yield 18, protion 90,000 bushe'ls, value $65,700; flaxseed 1,400 acres, acre yield 10.5, production 14.700 bushels, value $25,725; corn 10,000 acres, acre yield 25, production 250,000 bushels, value $180,000; potatoes 1,300 acres, acre yield 130, production 169,000 bushels, value $109,850; beans 550 acres, acre yield 15, production 8,250 bushels, value $24,750; seed peas 100 acres, acre yield 21, production 2,100 bushels, value $4,410; alfalfa seed 100 acres, acre yield 2, production 200 bushels, value $2,600; all tame hay 74,000 acres, acre yield 2.0, production 148,000 tons, value $1,243,200; wild hay 11,500 acres, acre yield 1.0, production 11,500 tons, value $86,250; apples 50 bushels, value $65, and truck crops and vegetables $6,200.

Livestock: Livestock products marketed in 1927 totaled $2,952,100 and placed Fergus county third. Combined crops and livestock gave the county second place, with a value of $10,135,970.

Value of Industries: The estimated value of the various industries in 1927 is as follows: manufacturing, $1,154,000; mining $400,000; coal mining $24,102, and tourist $260,000.

Total and Per Capita Production: The total production for the county is valued at $11,974 072 and per capita production for 1927 at $666.

Fergus county has a county agent and a home demonstration agent, both located at Lewistown.

Fergus county real estate and improvements were assessed in 1927 at $38,035,000, livestock at $1,890,000 and public utilities at $4,896,000. Total value of all property was $50,326,432, with a taxable value of $15,473,616.

The tax rate for county purposes last year was 28.5 mills on the taxable valuation, and the average rate for school purposes was 28.96 mills. Taxes for all general purposes averaged 22.4 cents an acre on farm and grazing lands, 51.2 cents a head on horses, 62.5 cents a head on cattle and 18.8 cents a head on sheep.

The county owed a net debt of $2,297,894.55 June 30, 1925. Two years later this debt had been reduced to $1,884,969.78, a decrease of $413.000.00, or nearly 20 per cent. School districts during the same two years, reduced net indebtedness from $603,745.18 to $469,-785.94, about 22 per cent. The per capita net debt for county and school purposes was approximately $101 June 30, 1927.

Additional Information: For more detailed information about the resources of Fergus county, write to the Commercial Club, Winifred, or to the secretary of the Central Montana Chamber of Commerce, Lewistown, Montana.

WEST CENTRAL MONTANA

Diversified Farming, Fruitgrowing, Lumbering and Smelting Are the Principal Industries—First in Dairying—Located on the Pacific Slope Side of the Mountains.

A pleasant land of timbered mountains, fertile valleys and clear streams, West Central Montana, lying on the Pacific slope side of the Rocky Mountains, embraces the counties of Powell, Deer Lodge, Granite, Missoula, Ravalli and Mineral. The principal industrial activities are smelting, lumbering and mining. Its agriculture is diverse in character and well established. It is one of the principal fruitgrowing regions of the state, ranks first in dairying, second in potato production and third in tame hay acreage. It ranks second in lumber production. Its smelters at Anaconda are the largest in the world.

In this district lies the famous Bitter Root valley where grains winning first place in world competition are grown. Irrigated farms produce a wide variety of crops with special emphasis on fruits, feed and truck crops. The Montana McIntosh apple raised here commands top prices on eastern markets. Conditions of production on much of the non-irrigated farm land in the district are generally more favorable from the standpoint of rainfall and length of season than in many other parts of the state, according to the Montana Experiment Station.

Three and nine tenths per cent of all the land in farms in the state is in West Central Montana and three per cent of all crops produced. The district produces 47 per cent of the apples, 14 per cent of the potatoes, 11 of tame hay, eight of seed peas, six of wild hay, six of alfalfa hay, five of barley, three of oats, two of rye, one of winter wheat and one per cent of the spring wheat.

Progress in the dairy industry in Montana centers here. Ravalli county has the largest cheese factory in the United States. Cream grading and cooperative marketing systems have been established.

There is much available grazing land in the district but it has not been utilized to the fullest extent by local farmers and stockmen, say Experiment Station reports. Stock growers from other districts and other states are finding the district a favorable summer grazing area.

In the eastern part of this region, in Powell and Granite counties, stockraising and general farming predominate, while in Ravalli and Missoula counties, dairying horticulture, swine and poultry production are becoming increasingly important.

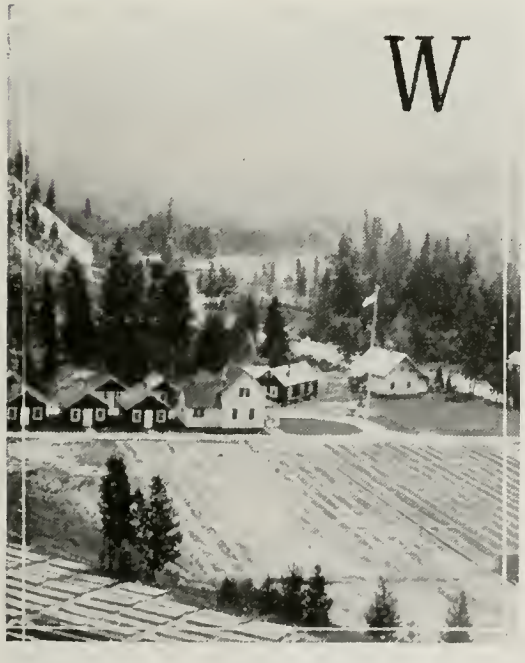
A new industry in western Montana is the manufacture of sugar in a million dollar refinery built at Missoula in 1927. Beets to supply the factory are successfully grown in the surrounding territory.

Lumbering is confined to the western and mining to the eastern and southeastern portions. Granite county produces annually more manganese than all the rest of the United States. Tremendous beds of phosphate are found, which the U. S. G. S. reports are of commercial importance and of higher grade than deposits in the southern states. They have not been developed.

MINERAL COUNTY

Date of Creation	Aug. 4, 1914	Est. County Population Jan. 1, 1928	2,013
Land Area	1,221 square miles	Population 1920	2,327
County Seat	Superior	Population County Seat	550
Altitude County Seat	2,725 feet	Growing Season	April 1 to Oct. 1

By John McMillan.



WHILE Mineral county has the fewest farms and the smallest farm acreage of any county in Montana, within its borders is located the largest forest nursery in the United States. The annual capacity of the nursery is 3,000,000 seedlings.

With the crest of the Coeur d'Alene Mountains marking its northern boundary and the crest of the Bitter Root Range its western boundary, Mineral county is located in the extreme western end of the state, next to the Idaho line. Nearly all of the county is included within the Lolo National Forest, which provides excellent grazing for the thousands of sheep turned on the forest each grazing season.

Surface and Soil: Composed principally of picturesque mountain ranges, the county is practically cut in two by the Clark's Fork of the Columbia. The valley of the river makes one of the longest and most fertile spots in the state, though in places the valley is narrow. The soil is principally a sandy loam.

Crops: Wheat, oats, rye, barley and corn. Potatoes and all other root crops, garden truck, fruits and berries of all kinds, and hay are raised in abundance. The land yields excellent crops.

Industries: Lumbering and mining are the chief industries. Agriculture is assuming an important place in the growth of the county.

Mineral Resources: The patented mining claims in Mineral county comprise 4,375 acres. Silver, lead, gold, and copper are the principal metals found. Large amounts of placer gold have been taken from the streams emptying into the Clark's Fork from the south.

Timber: The national forest timber in Mineral county is estimated at 1,200,000 M. feet. In addition, there is a large acreage of private holdings. Mineral is one of the most heavily timbered counties in the State.

Land Values: Irrigated lands, $25 to $50 an acre; non-irrigated, $10 to $30 an acre, and grazing lands, $5 to $15 an acre.

Transportation and Highways: The main line of the Chicago, Milwaukee, St. Paul and Pacific traverses the county east and west, and a main line of the Northern Pacific runs through the eastern half of the county as far west as St. Regis. From St. Regis a Northern Pacific branch line runs westward and taps the Coeur d'Alene mining district of Idaho. A main east and west highway parallels the railroads.

Education: There are nine grade schools in the county and three accredited high schools, the total enrollment being 529.

Cities and Towns: In addition to Superior, the county seat, other towns are Alberton, Iron Mountain, St. Regis, DeBorgia, Haugan, and Saltese.

Climatological: Early and mild spring weather; summers moderately cool; nice fall with much Indian Summer weather; winters usually mild.

Crop Production: The value of all crops in 1927 totaled $161,170, divided as follows: Spring wheat 1,000 acres, acre yield 20, production 20,000 bushels, value $19,400; oats 2,000 acres, acre yield 52, production 104,000 bushels, value $45,760; barley 1,000 acres, acre yield 42, production 42,000 bushels, value $25,200; potatoes 200 acres, acre yield 160, production 32,000 bushels, value $20,800; all tame hay 2,000 acres, acre yield 1.8, production 3,600 tons, value $30,240; wild hay 1,300 acres, acre yield 1.1, production 1,400 tons, value $10,500; apples 3,900 bushels, value $5,070; truck crops and vegetables $2,500, and miscellaneous fruits $1,700.

Livestock: The value of livestock products marketed in 1927 totaled $117,900. Combined crops and livestock were $279,070.

Value of Industries: The estimated value of manufacturing was $20,000; metal mining $20,000, lumbering $136,710 (includes value of lumber cut only. Value added by manufacturing not included), and tourist $180,000.

Total and Per Capita Production: The total production for the county is valued at $635,780 and per capita production for 1927 at $316.

The assessed value of all property in the county in 1927 was $9,778,664, with real estate and improvements valued at $1,637,620, and public utilities at $7,431,075. The total taxable value was $3,657,889. The tax rate for county purposes was 21.9 mills. The average tax for all general purposes was 7.9 cents an acre on farm and grazing lands, 49.9 cents a head on horses, 59.9 cents a head on cattle and 11.5 cents a head on sheep.

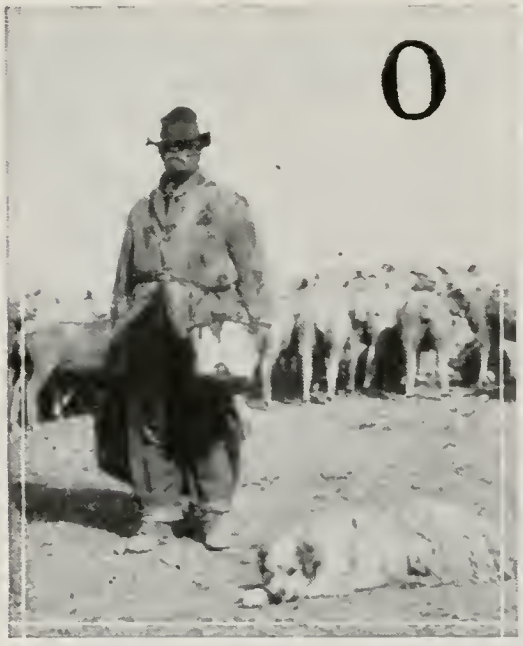
During the three-year period ending June 30, 1927, net indebtedness of the county was reduced from $150,724.65 to $122,570.36, a cut of approximately 18½ per cent. The net indebtedness of school districts on that date was $28,574.10, making a per capita net debt for county and school purposes of $64.95.

Additional Information: For more detailed information about the resources of Mineral county, write to the secretary of the Commercial Club at Superior, Montana.

POWELL COUNTY

Date of Creation	Jan. 1, 1901	Est. County Population Jan. 1, 1928	5,734
Land Area	2,350 square miles	Population 1920	6,909
County Seat	Deer Lodge	Population County Seat	3,600
Altitude of County Seat	4,519 feet	Growing Season	110-130 days

By R. B. Tootell.



NE of the oldest as well as one of the most important industries in world agriculture is sheep raising. Powell county plays an important part in the wool production of the state, there being approximately 100,000 sheep in the county which each year shear 1,000,000 pounds of high class wool. Lofty forested mountains which form the boundaries of two large valleys provide ideal grazing for the large bands. Elevation of the agricultural lands runs from four to five thousand feet, while the taller peaks rise to heights of ten thousand feet and more. There are numerous streams fed by the snows of the mountains, which in turn yield waters for irrigation of abundant crops. Wonderful scenery abounds in the country.

Surface and Soil: Most of the area of Powell county is mountainous. The soils vary from a rather light sandy loam to fairly heavy clay and silt loams. Parts of both the Blackfoot and Deer Lodge Valleys have been rather heavily glaciated and in places the rolling moraines are very noticeable. Drainage is required on some low lands.

Drainage and Water Supply: There are at present 60,000 acres of irrigated land in the county, and with further development, 30,000 more acres could be added. All irrigation is of the gravity type. The systems are privately owned and the water right goes with the land. The Blackfoot River and many small streams supply the water for irrigation, since the water from the upper Deer Lodge

River is unfit for irrigating purposes due to waste products which are discharged into it from the smelter at Anaconda. Excellent drinking water is found in all parts of the county.

Crops: Sheep raising is the leading agricultural industry. Some of the finest pure-bred sheep of the northwest are found in this section. The beef cattle industry is an important one, and many large and very well-bred herds are kept in the county. The dairy industry is a comparatively new one, but with the Butte and Anaconda markets so close at hand, this industry is destined to make rapid growth in the near future. Hay crops, both wild and tame, are grown far more extensively than the grain crops. These provide winter feed to supplement the vast area of fine grazing land which the county has. Small grains are grown to quite an extent, but mostly for use as feed. Hundreds of carloads of fine potatoes are shipped annually from this section, while high quality vegetables are produced in abundance. Peas grow remarkably well, and with the erection of a sugar beet plant at Missoula, sugar beets should become a cash crop of much importance.

Industries: In Deer Lodge is located the shop equipment of the Chicago, Milwaukee, St. Paul and Pacific Railway. This is the largest industry other than agriculture, in the county. Some men are employed in the mines and in the making of lime at the Elliston plant. Small scale lumbering is gaining a foothold.

Mineral Resources: The county holds a large store of potential mineral wealth and has yielded large sums in placer gold in the past. There are still some fields suitable for dredging with a possibility of rich results. Several rather promising deposits of ore await the entrance of better transportation facilities. Large deposits of phosphates are found in parts of the county, while copper, gold, silver, and lead indications are not lacking.

Timber: Powell county is rich in timber resources, although as yet there is no large scale lumbering. Some of the area under the national forests is contained in Powell county. There are great possibilities for an increasing lumber industry in the county.

Land Values: Prices of agricultural land vary from $15 to $100 an acre, depending upon location, altitude, markets and crop adaptability. The average price for good improved irrigated land is $50 per acre. Since this county is one of the oldest in the state, the land is owned and operated on a large scale by individuals and companies. More settlers are needed to break these large holdings up into economical farming units so that the agricultural resources of the county may be more fully devloped.

Transportation and Highways: The Northern Pacific and the Chicago, Milwaukee, St. Paul and Pacific Railways cross the southern part of the county. The main line of the Northern Pacific serves the Little Blackfoot Valley and the country tributary to it. Improved highways reach all farming sections. An area of about 324 square miles in the northern end of the county is reached only by pack trails.

Education: There are 38 schools in the county, including two high schools. The total enrollment is 1,141.

Cities and Towns: Deer Lodge, the county seat, is the only city in the county. Elliston, Avon, Garrison, and Gold Creek are small towns along the railroads. Helmville and Ovando are inland towns in the Blackfoot Valley.

Climatological: The annual precipitation averages from 11 inches in the Deer Lodge Valley to around 20 inches in the Blackfoot Valley, with higher marks in the neighboring high mountains. The summer temperature seldom passes 90 degrees, and the nights are always cool. The majority of the winters are very pleasant, although an occasional drop in temperature is experienced.

The State Penitentiary is located at Deer Lodge.

Crop Production: Powell placed ninth in the value of tame hay at $683,720. The value of all crops in Powell county was $1,432,195, divided as follows: Spring wheat 3,000 acres, acre yield 16, production 48,000 bushels, value $46,560; winter wheat 2,000 acres, acre yield 24, production 48,000 bushels, value $44,160; all wheat 5,000 acres, acre yield 19.2, production 96,000 bushels, value $90,720; oats 5,000 acres, acre yield 40, production 200,000 bushels, value $88,000; barley 2,100 acres, acre yield 27, production 56,700 bushels, value $34,020; rye 300 acres, acre yield 25, production 7,500 bushels, value $5,475; potatoes 900 acres, acre yield 130, production 117,000 bushels value $76,050; beans 150 acres, acre yield 20, production 3,000 bushels, value $9,000; seed peas 100 acres, acre yield 20, production 2,000 bushels, value $4,200; all tame hay 39,000 acres, acre yield 2.09, production 81,400 tons, value $683,720; wild hay 32,500 acres, acre yield 1.5, production 48,700 tons, value $365,250; truck crops and vegetables $4,300; miscellaneous fruits $1,700.

Livestock: The total value of livestock products marketed in 1927 was $967,300. Combined crops and livestock were valued at $2,399,495.

Value of Industries: The estimated value of manufacturing was $1,256,000. Metal mining was valued at $25,000, lumbering $163,680 (includes value of lumber cut only. Value added by manufacture not included; tourist $105,000.

Total and Per Capita Production: The total production of the county was $3,949,175 and per capita production for 1927 was $689.

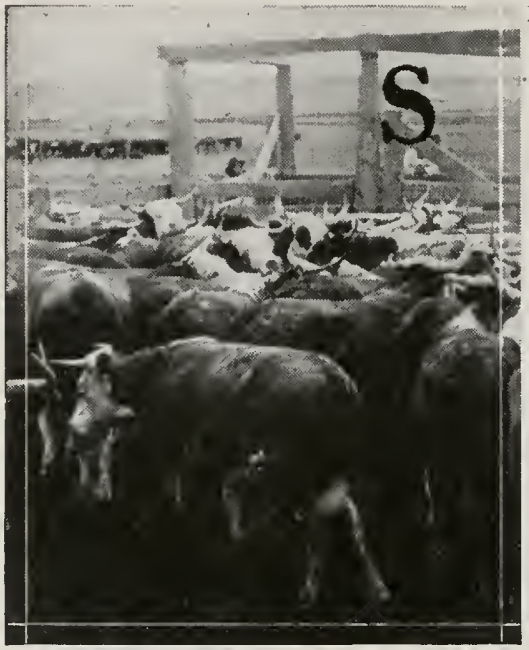
In 1927 real estate and improvements were valued at $9,958,000 for assessment purposes, livestock at $1,381,000 and public utilities at $5,978,000. The assessed value of all property was $19,573,467, with a taxable value of $6,391,898. The county tax rate of 15 mills on the taxable valuation and the average school rate of 18.79 mills are among the lowest in the state. The average tax on farm and grazing lands was 9.03 cents an acre, on horses 33.1 cents a head, on cattle 48.8 cents a head and on sheep 12.9 cents.

The net indebtedness of the county dropped from $305,676.65 in 1924, to $246,515.86 June 30, 1927. On the latter date the net indebtedness of district schools amounted to only $41,901.49, and the per capita net debt for county and school purposes was $41.74.

Additional Information: For more detailed information regarding the resources of Powell county, write to the secretary of the Kiwanis Club, Deer Lodge, Montana.

GRANITE COUNTY

Date of Creation	March 2, 1893	Est. County Population Jan. 1, 1928	3,278
Land Area	1,773 square miles	Population of County 1920	4,167
County Seat	Philipsburg	Population of County Seat	1,500
Altitude of County Seat	5,175 feet	Growing Season	60-80 days



SMALL in area and population, Granite county is unusually well diversified in industrial as well as agricultural resources. Lying in the middle western part of Montana, most of its territory is mountainous. The Continental Divide crosses its southeastern border and a spur of the Rocky Mountains defines its western boundary line.

Surface and Soil: The agricultural areas of Granite county are largely confined to the Flint and Rock Creek Valleys and to the Hell Gate River Valley. High mountains protect these valleys, which are among the most fertile in the state. The soil is alluvial, rich and deep.

Crops: The principal crops are oats, wheat, barley, flax, alfalfa, timothy, clover and all garden vegetables. The annual livestock production equals that of agriculture, as does also the metal production.

Drainage and Water Supply: Rock Creek and Flint Creek, rising in the high mountains in the southern end of the county, empty into the Hell Gate River, which runs westerly through the northern end of the county. These streams have many small tributaries.

Industries: Mining is the principal industry. The sapphire mines on Rock Creek are reputed to be the largest in the world. Other industries are agriculture and stock raising; also lumbering on a small scale.

Mineral Resources: Silver and manganese are the principal minerals. Gold, zinc, lead, copper and lignite coal are also produced commercially. There is also reported to be platinum, corundum, phosphate, and deposits of brick clay in the county, but their commercial importance has not been determined.

Timber: There are large stands of commercial timber. In addition to large private holdings, portions of the Deer Lodge National Forest and the Missoula National Forest are included within the county.

Land Values: Improved irrigated land ranges in price from $40 to $75 an acre; unimproved irrigated land $15 to $30, and unimproved non-irrigated land from $8 to $15 an acre.

Transportation and Highways: The main lines of the Northern Pacific and the Chicago, Milwaukee, St. Paul and Pacific cross the county near the northern border, and a branch of the Northern Pacific runs up Flint Creek to Philipsburg. The Yellowstone Trail parallels the railroads. There is a main east and west highway through the county.

Education: There are 19 schools with a total enrollment of 688.

Cities and Towns: Philipsburg, the county seat, is the largest and most modern town and situated in the mining district. Hall, in the northern part, lies in one of the most fertile agricultural districts. Drummond, the junction point of the Northern Pacific branch to Philipsburg, is the trading center for the northern section of the county.

Climatological: On account of the high altitude Granite county has a short growing season. An observation covering a period of 19 years shows an annual temperature of 41.4 degrees with an annual precipitation of 15.18 inches, and an average of 75 frost-free days.

Crop Production: The value of all crops in 1927 totaled $535,568, divided as follows: Spring wheat 1,000 acres, acre yield 19, production 19,000 bushels, value $18,430; winter wheat 1,000 acres, acre yield 21, production 21,000 bushels, value $19,320; all wheat 2,000 acres, acre yield 20, production 40,000 bushels, value $37,750; oats 2,000 acres, acre yield 50, production 100,000 bushels, value $44,000; barley 2,100 acres, acre yield 35, production 73,500 bushels, value $44,100; rye 100 acres, acre yield 21, production 2,100 bushels, value $1,533; potatoes 500 acres, acre yield 150, production 75,000 bushels, value $48,750; seed peas 100 acres, acre yield 21, production 2,100 bushels, value $4,410; all tame hay 21,000 acres, acre yield 1.8, production 37,800 tons, value $317,520; wild hay 4,000 acres, acre yield 1.1, production 4,400 tons, value $33,000; apples 1,850 bushels, value $2,405; truck crops and vegetables $1,000; miscellaneous fruits $1,100.

Livestock: The value of all livestock products marketed in 1927 totaled $797,600. Combined crops and livestock were valued at $1,333,168.

Value of Industries: The estimated value of manufacturing in 1927 was $125,000. In metal mining the county placed third with $500,000. Lumbering totaled $78,585 (includes value of lumber cut only; value added by manufacturing not included), and tourist $140,000.

Total and Per Capita Production: The total production for the county is valued at $2,176,753 and per capita production at $664.

The assessed value of real estate and improvements in 1927 was $4,440,725. Livestock was assessed at $520,377 and public utilities at $3,835,971. The total value of all property

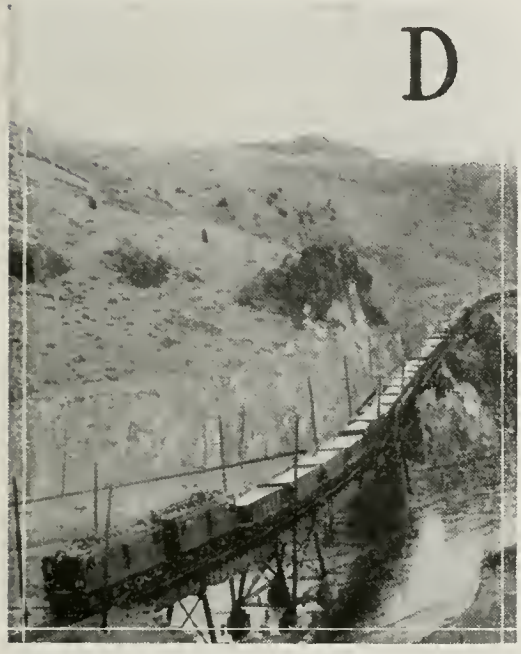
was $9,918,705, with a taxable value of $3,503,452. The county tax rate was 30.5 mills on taxable values, and the average rate for school purposes was only 10.03 mills. Farm and grazing lands carried an average general tax for all purposes of 21.2 cents per acre, horses 41.4 cents per head, cattle 61.2 cents per head and sheep 15.5 cents.

The net county debt on June 30, 1924, was $291,097.37. On June 30, 1927, it was $256,696.27—a 12 per cent reduction. During the same three-year period the district schools reduced their net indebtedness from $48,238.21 to $35,194.55, or more than 27 per cent. Per capita, the net debt for county and school purposes was $70.04 on June 30, 1927.

Additional Information: For more detailed information about the resources of Granite county, write to the state publicity division, Helena, Montana.

DEER LODGE COUNTY

Date of Creation .....Feb. 2, 1865	Est. Population of County Jan. 1, 1928..19,642
Land Area.....730 square miles	Population of County 1920.....15,323
County Seat.....Anaconda	Population of County Seat.....11,668
Altitude of County Seat.....5,288 feet	Growing Season.....86 days



DEER LODGE, one of the original nine counties of Montana, with the northern half on the Pacific coast slopes and the southern half on the Atlantic coast side of the continental divide, is primarily an industrial county. The largest copper smelter in the world is located in Anaconda, the county seat and here is treated one-fourth of all the copper ore produced in the United States. When operating at capacity, the smelter employs 4,000 men. In addition to the smelter there have been erected plants for the manufacture of by-products, such as arsenic, sulphuric acid and super-phosphate fertilizer. These plants are the producers of the largest supply of unrefined arsenic in the United States and the second largest of refined white arsenic. The sulphuric acid plant has a capacity of 70,000 tons a year, and the phosphate plant of approximately 30,000 tons a year. The phosphate rock is shipped from mines at Conda, Idaho. A fire brick plant is operated in connection with the smelter. A large foundry, boiler and machine shop is also operated which does custom work as well as work for the smelter and the mines.

Some farming and truck gardening is carried on in the Deer Lodge Valley, on the Pacific coast slope. Stock raising is the principal industry on the eastern side of the mountains, winter forage being put up along the Big Hole River, while good summer range is found in the national forests that occupy more than one-half the total area of the county.

Drainage and Water Supply: The Big Hole River, forming a portion of the southern boundary of the county, and the Deer Lodge River through the northern part, are the principal streams. Numerous tributaries rising in the high mountains feed these streams.

Mineral Resources: While most of the ore treated in the Anaconda plant comes from Butte, there are a number of mining districts in the northern end of the county. Gold, silver, copper, lead and zinc have been produced in commercial quantities. There are also deposits of coal and limestone, and sapphires have been found along Dry Cottonwood Creek.

Land Values: The price of irrigated land ranges from $40 to $100 an acre; non-irrigated farm lands from $10 to $40, and grazing land from $5 to $10 an acre. There are 4,154 acres of patented mineral ground in the county.

Timber: There are 305,140 acres of the county included within the Deer Lodge National Forest. Considerable timber is cut each year.

Transportation and Highways: The main lines of the Northern Pacific and of the Chicago, Milwaukee, St. Paul & Pacific Railways follow the Deer Lodge River west, and two east and west highways traverse the county. The city of Anaconda has nearly ten miles of paved streets. Ten miles of the main highway in Deer Lodge county between Anaconda and Butte are paved. Anaconda is the home office of the Intermountain Transportation Company, running the highest class of auto busses between Anaconda and Butte, Deer Lodge, Philipsburg and Hamilton, a combined distance of 136 miles.

Educational: There are 20 schools, including one high school, with a total enrollment of 2,049.

Cities and Towns: Anaconda, modern and up to date in all respects, is the only city in the county. Beautiful scenery is found in the mountains, and attractive Alpine lakes. The smokestack at the smelter is the highest in the world—585 feet. A large fish hatchery is maintained at Anaconda from which many streams are stocked annually. Other institutions in the county are the State Hospital for the Insane at Warm Springs, and the State Tuberculosis Sanitarium at Galen.

Climatological: The high altitude of Deer Lodge county is responsible for the short growing season. The average temperature is 42.2 degrees and the annual precipitation averages 13.74 inches. Observation covering a period of 23 years shows an average of 93 frost-free days annually.

Crop Production: The value of all crops produced in 1927 was $435,004, divided as follows: Spring wheat 1,000 acres, acre yield 18, production 18,000 bushels, value $17,460; oats 2,000 acres, acre yield 45, production 90,000 bushels, value $39,600; barley 1,000 acres, acre yield 40, production 40,000 bushels, value $24,000; rye 200 acres, acre yield 19, production 3,800 bushels, value $2,774; potatoes 700 acres, acre yield 175, production 122,500 bushels, value $79,625; all tame hay 11,000 acres, acre yield 2.3, production 25,300 tons, value $212,520; wild hay 6,700 acres, acre yield 1.0, production 6,700 tons, value $50,250; apples 750 bushels, value $975; truck crops and vegetables $6,100; miscellaneous fruits $1,700.

Livestock: The value of livestock products marketed in 1927 totaled $185,700. Combined crops and livestock were $620,704.

Value of Industries: Deer Lodge county took first place in the estimated value of manufacturing with a total of $9,450,000. Metal mining was valued at $50,000, lumbering $52,080 (includes value of lumber cut only; value added by manufacture not included), and tourist $260,000.

Total and Per Capita Production: The total production for the county was $10,432,784, giving Deer Lodge sixth place and per capita production for 1927 was $531.

Real estate and improvements were assessed at $19,528,359 in 1927, livestock at $334,185 and public utilities at $3,281,672. The total value of all property was $31,958,599, with a taxable value of $9,731,370.

The county tax rate of 17 mills on taxable valuations and the average school rate of 18.05 mills are both considerably below the state average. Taxes on farm and grazing lands averaged 12.9 cents an acre last year, and the average tax on horses was 50.8 cents a head, on cattle 61.5 cents a head, and on sheep 15.8 cents.

Net indebtedness of the county June 30, 1924, was $181,100.28. By June 30, 1927, it had been reduced to $112,578.66, or more than 37 per cent, at which time the net debt of district schools was only $2,046.59. The per capita net debt for county and school purposes was $7.48, about one-eighth of the state average, and by far the lowest of any county in the state.

Additional Information: For more detailed information about the resources of Deer Lodge county, write to the president of the Kiwanis Club, Anaconda, Montana.

RAVALLI COUNTY

Date of Creation	April 1, 1893	Est. County Population Jan. 1, 1928	9,061
Land Area	2,396 square miles	Population 1920	10,000
County Seat	Hamilton	Population County Seat	1,800
Altitude County Seat	3,600	Growing Season	125-130 days

By G. L. Knight.

HOUGH generally known as the Bitter Root Valley, Ravalli county lies in the western part of the state between the Hellgate mountains on the east and the Bitter Root mountains on the west, being protected on both sides by high mountain ranges. High winds are unknown, thus assuring a remarkably equable climate; this combined with the fertile silt soil and the never failing supply of irrigation water has made this the premier fruit and vegetable valley of the northwest.

The Bitter Root River having its source at the continental divide at the south end of the valley flows its entire length, emptying into the Clarks Fork at Missoula and with its tributaries is all used in the irrigation systems of the valley.

Surface and Soil: The valley, approximately 80 miles long with an average width of from 10 to 12 miles, is rolling, sloping in a series of rolls or benches from the river up on each side to the foothills, the various levels being adapted to certain crops.

Crops: Practically everything known to the temperate zone is produced in this valley and does well, ranging from alfalfa through all the forage crops, all of the small grain crops and is especially adapted to fruit and garden crops, particular attention being paid to strawberries, sour cherries and the McIntosh apple. In vegetables, potatoes, celery and head lettuce bid fair to be the leaders. Two canneries furnish a market for the cherries, peas, cabbage and pumpkins at present and are being enlarged to include various other vegetables.

The following statistics will show the versatility and adaptability of the valley:

During the year 1927 there was shipped from Ravalli county 41 cars of dairy products, 44 of canned goods, 106 of apples, 21 of strawberries, 230 of potatoes, 52 of mixed vegetables, 23 of peas and beans, 23 of oats, 102 of wheat, 346 of hay, seven of horses, 148 of cattle, 115 of sheep, 100 of hogs, eight of wool, 271 of lumber, 11 of wood and 42 miscellaneous and nearly as many potatoes were held over for the spring market as were sold last fall.

Water and Drainage: Practically every canyon opening out of the mountains has

a small stream that is used for irrigation as well as the main river, which has many canals running out of it and the supply of water for that purpose has never failed even in the driest years.

The slope of the valley from each side towards the river and the whole valley towards the north insures plenty of drainage.

Minerals: Gold, silver, copper, and lead are present in the valley over the 4,000 acres of mineral bearing lands and while they are practically undeveloped there is a large field in prospect.

Timber: This valley has one of the largest reserves of any county in the state as well as millions of feet of privately owned timber, which will furnish work for a large number of men for many years, the timber consists mostly of yellow and lodge pole pine, douglas and alpine fir, tamarac, larch and cottonwood.

Transportation and Highways: The International Scenic Highway traverses the valley from north to south and the trip over the Big Hole mountain at the south is one that will never be forgotten. At the top of this mountain the road divides, one branch leading to the east past the Big Hole battle field through the famous Big Hole district, Wisdom and on to Dillon and to the west entrance to the Yellowstone Park; the other to the west down the mountain into Idaho over one of the finest mountain roads in the northwest along the Salmon river to southern and western Idaho.

At Hamilton the famous Skalkaho highway turns to the east and leads up on an easy grade through a wonderful panaroma of forests, canyons, trout streams, waterfalls and wilderness vistas and down on the east side of the mountains and on to Anaconda and Butte. Side roads in the valley are uniformly in good condition and furnish side trips to the various canyons and trout streams past the prosperous farms and strawberry fields and apples and cherry orchards of the valley.

The Bitter Root branch of the Northern Pacific furnishes rail transportation from Darby on the south, to Missoula on the north and gives adequate service. Two bus lines furnish transportation over the same territory.

Education: Hamilton, the county seat and largest town of the valley, Darby, Corvallis, Victor and Stevensville have fully equipped high schools, a number of district and consolidated schools which furnish adequate grade school facilities throughout the valley.

Cities: Hamilton, the county seat and largest town, is situated near the center of the valley with Darby to the south and Corvallis, Victor, Stevensville and Florence to the north, all of which are prosperous and lively communities.

Industries: Agriculture in all its branches is the principal industry of the valley, the most important being dairying, with its three creameries and five cheese factories, combined with diversified farming such as sugar beets, potatoes, hogs, sheep and beef cattle as well as the small fruits and vegetables mentioned before, insures the valley farmer an income regardless of weather or market conditions. Two rapidly expanding canneries furnish a market for the vegetable crops and with two seed pea warehouses furnish considerable labor during the season, while the lumber industry furnishes a steady demand during most of the year.

Fishing and Hunting: Practically every one of the many streams running from the mountains is full of trout, making the valley a mecca for the fisherman. The high mountains are the homes of the deer, elk and mountain lion and the sportsman is practically assured of securing his quota with only a little effort.

Climatological: The annual normal temperature is 45.7 degrees and the annual average precipitation is 12.24 inches. Observations covering 24 years record a frost-free period of 109 days for Ravalli county.

Crop Production: The value of all crops in Ravalli county in 1927 totaled $2,088,634, divided as follows: Spring wheat 11,000 acres, acre yield 27, production 297,000 bushels, value $288,090; winter wheat 2,000 acres, acre yield 25, production 50,000 bushels, value $46,000; all wheat 13,000 acres, acre yield 26.7, production 347,000 bushels, value $334,090; oats 6,000 acres, acre yield 58, production 348,000 bushels, value $153,120; barley 4,400 acres, acre yield 41, production 180,400 bushels, value $108,240; rye 200 acres, acre yield 24, production 4,800 bushels, value $3,504; corn 1,000 acres, acre yield 25, production 25,000 bushels, value $18,000; potatoes 1,800 acres, acre yield 155, production 279,000 bushels, value $181,350; seed peas 875 acres, acre yield 21, production 18,400 bushels, value $38,640; canning peas 27,000 cases, value $67,500; all tame hay 40,000 acres, acre yield 2.5, production 100,000 tons, value $840,000; wild hay 2,700 acres, acre yield 1.25, production 3,400 tons, value $25,500; apples 163,300 bushels, value $212,290; truck crops and vegetables $69,000; miscellaneous fruits $37,400.

Livestock: Livestock products marketed in 1927 totaled $1,282,600. Combined crops and livestock were $3,371,234.

Value of Industries: The estimated value of manufacturing was $393,000. The value of lumber in 1927 was $453,375 (includes value of lumber cut only; value added by manufacturing not included), and tourist $240,000.

Total and Per Capita Production: The total production for the county is valued at $4,457,609 and per capita production for 1927 at $492.

Ravalli county has a county extension agent located at Hamilton.

Assessment statistics for 1927 value real estate and improvements at $13,332,790, livestock at $1,153,184, and public utilities at $1,789,694. The total value of all property is $18,556,056, with a taxable value of $5,713,229.

The tax for county purposes last year was 26 mills on taxable valuations. The school rate averaged 32.48 mills. The average tax on farm and grazing lands was 39 cents an acre, on horses 68.2 cents a head, on cattle 81.6 cents a head and on sheep 19.6 cents.

The net indebtedness of the county was reduced from $484,914.22 in 1924 to $403,125.66 June 30, 1927. The net indebtedness of district schools on the latter date was $201,594.26, and the per capita net debt for county and school purposes was $59.88, exactly the average for the entire state.

Additional Information: For more detailed information about the resources of Ravalli county, write to the Commercial Club at Darby or Stevensville, or to the Chamber of Commerce at Hamilton, Montana.

MISSOULA COUNTY

Date of Creation.....Feb. 2, 1865
Land Area.....2,649 square miles
County Seat.....Missoula
Growing Season.....115 days
Altitude of County Seat.....3,223 feet
Est. County Population Jan. 1, 1928....18,919
Population County Seat 1920.....12,668

By W. C. Peat.

IN West Central Montana, Missoula county is midway between the north and south boundaries. The Idaho-Montana boundary defines the border of the southwestern corner. All of the county is in a mountainous region with the Missoula and Grass Valley in the central part of the county, all irrigated and agricultural, comprising 70,000 acres. The Bitter Root Valley, in the south central part, and the Blackfoot Valley, in the east central district, are narrow and fertile valleys. There are 25,000 acres of the Blackfoot in Missoula county.

Surface and Soil: Soil types range from sandy and clay loam in the valleys and on the lower benches to coarse gravel on the higher elevations.

Crops: In the Big Blackfoot Valley the principal crops are grain and hay. Considerable stock is also raised. In the other agricultural districts small grain, alfalfa, apples, and bush fruit, potatoes, and garden truck are the principal crops. Dairying and hog raising are well established. Sugar beets are also grown successfully throughout the county.

Drainage and Water Supply: The sources of water supply for all irrigation streams are from the many mountain streams fed by snow and glaciers. The principal streams are the Missoula River, entering the county at the extreme southeastern corner, the Bitter Root and Blackfoot Rivers, which flow into the Missoula River in the county.

Industries: The Missoula and Grass Valleys near Missoula, containing 70,000 acres, the lower Bitter Root, of which 20,000 acres are within the county, and the lower Blackfoot, of which about 20,000 acres are also within the county, are important agricultural sections. This county leads the State in the production and manufacture of lumber and lumber products. Other industries include car shops and round-houses of the Northern Pacific Railroad, several wood-working shops, metal-working plants, brick, tile and concrete works, flour, creameries, and factories using the by-products of the farms.

A million dollar beet sugar factory is being built at Missoula. This will be completed in time to care for the 1928 sugar beet crop.

Timber: The timberlands of the county are very extensive. The eastern half of the county is almost solid timber land, as is also the southwestern part. Missoula has the largest saw mill capacity of any county. Much timber from other counties is made into lumber in these mills. At Bonner and Milltown, seven miles east of Missoula, are two modern saw mills whose total annual capacity is nearly 150,000,000 board feet. This is the second largest lumber center between the Atlantic and Pacific coasts and every modern appliance for the rapid handling of lumber from the timber to the finished product is used. In Missoula there is one mill with a capacity of about 20,000,000 board feet, and also several other small mills in the county.

Land Values: The average value of improved irrigated land ranges from $50 to $100 per acre and improved non-irrigated land ranges from $25 to $50. Small improved tracts near the city sell from $350 to $600 per acre.

Transportation and Highways: The main lines of the Northern Pacific and the Chicago, Milwaukee, St. Paul & Pacific traverse the county near the southern boundaries. Branch lines of the Northern Pacific serve the Bitter Root and Flathead Valleys. The Milwaukee road has built a branch into the lumber districts of the upper Blackfoot. Splendid highways and national trails enter the county.

Education: Missoula county is the educational center for western Montana. It has 42 schools with an enrollment of 3,839, the State University being located in this county. This is the first higher institution of learning to give academic recognition to the profession of public relations.

Cities and towns: Missoula is one of the largest cities in the State. The State University and the headquarters of the United States Forest Service District No. 1, embracing several states, are located here.

Fort Missoula, known as the "Million Dollar Post" because of its excellence in construction, is located just west and south of Missoula. A battalion of the Fourth Infantry is now stationed at the fort. The monthly payroll is nearly $19,000.

Beautiful drives, well-stocked streams, hunting and a wide variety of outdoor sports, together with beautiful sections of scenery, are among the tourist attractions.

Climatological: According to the weather bureau station at Missoula, the average temperature is 44.2 degrees and the average annual precipitation is 15.48 inches. Observations of 31 years record a frost-free period of 119 days annually.

Crop Production: The value of all crops in Missoula county totaled $1,029,255, divided as follows: Spring wheat 12,000 acres, acre yield 20, production 240,000 bushels, value $232,800; winter wheat 3,000 acres, acre yield 23, production 69,000 bushels, value $63,480; all wheat 15,000 acres, acre yield 20.6, production 309,000 bushels, value $296,280; oats 5,000 acres, acre yield 46, production 230,000 bushels, value $101,200; barley 2,100 acres, acre yield 37, production 77,700 bushels, value $46,620; rye 2,500 acres, acre yield 23, production 57,500 bushels, value $41,975; potatoes 700 acres, acre yield 140, production 98,000 bushels, value $63,700; beans 100 acres, acre yield 22, production 2,200 bushels, value $6,600; seed peas, 200 acres, acre yield 24, production 4,800 bushels, value $10,080; all tame hay, 21,000 acres, acre yield 2.3, production 48,300 tons, value $405,720; wild hay, 4,000 acres, acre yield 1.0, production 4,000 tons, value $30,000; apples 49,000 bushels, value $63,700; truck crops and vegetables, $31,400; miscellaneous fruits $1,700.

Livestock: Livestock products marketed in 1927 totaled $709,100. Combined crops and livestock were valued at $1,738,355.

Value of Industries: The estimated value of manufacturing in 1927 was $5,000,000 and placed Missoula county sixth in the state. Lumbering was valued at $384,555 (includes value of lumber cut only. Value added by manufacturing not included). Missoula was first in value of tourist trade, totaling $635,000.

Total and Per Capita Production: The total production for the county is valued at $7,757,910 and per capita production for 1927 at $410.

Real estate and improvements were assessed in 1927 at $27,193,506, livestock at $434,599 and public utilities at $8,800,842. The total assessed value of all property was $49,223,686, with a taxable value of $15,267,585.

The tax rate for county purposes last year was 24.25 mills on the taxable valuation. The average school levy was 26.57 mills. Taxes for all general purposes averaged 14.6 cents an acre on farm and grazing lands, 62.3 cents a head on horses, 67.4 cents a head on cattle and 15.2 cents a head on sheep.

The net debt of the county dropped from $848,457.22 to $797,538.76 during the three years ending June 30, 1927. The total net debt of school districts also decreased slightly, such debt amounting to $291,484.51 in 1927, as compared with $295,035.47 in 1924. The per capita net debt for county and school purposes amounted to $57.51 June 30, 1927.

The county agent is located at Missoula.

Additional Information: For more detailed information about the resources of Missoula county, write to the Chamber of Commerce, Missoula, Montana.

A SCENE IN WESTERN MONTANA

NORTH EASTERN MONTANA

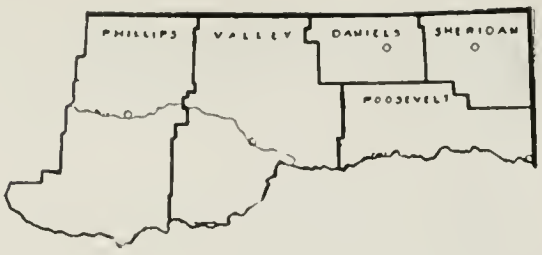
Ranks High in Wheat and Oats—Little Irrigated Land Outside of the Milk River Valley and Fort Peck Reservation—Tendency to Abandon the One-Crop System.

North Eastern Montana is more nearly exclusively agricultural in character than any other district in the state. Daniels, Sheridan and Roosevelt counties, which occupy the eastern part, aside from coal mining, are devoted almost wholly to farming. Most of the land south of the Milk River, in Phillips and Valley counties, which occupy the western part, is devoted to stockraising.

The counties in this district contain 12.1 per cent of all land in farms in the state and produce 18 per cent of all crops. Forty-two per cent of all flax is raised here, 26 per cent of the spring wheat, 24 of rye, 22 of all wheat, 21 of oats, 20 of corn, 16 of alfalfa seed, 13 of wild hay, 10 of barley, eight of potatoes, five of tame hay, three of alfalfa hay, three of dry beans, two of winter wheat and two per cent of sugar beets. Only one per cent of the apple trees are planted in this district.

Non-irrigated farming predominates, there being practically no irrigated lands outside of the Milk River valley and the old Fort Peck Indian reservation. Both of these are government projects. Reclamation has proceeded faster than settlement and development in the Milk River valley. The land has been devoted chiefly to native hay and operated in units so large as to preclude diversified farming, though well adapted to it. In the past year or two a movement has developed to reduce the size of the units and bring in farmers.

Production on non-irrigated land in the three eastern counties makes this a banner wheat producing district. It is first in oats. Scobey, in Daniels



county, lays claim to being the largest primary wheat market in the world.

Some of the oldest non-irrigated farming areas of the state are in this district. Summer fallowing is increasing. Corn, which has recently been found to be well adapted to the district is used to some extent as a substitute for straight summer fallow. Barley is the leading small grain feed crop, the Horn variety being recommended. Sweet clover is the most important pasture crop.

Three general types of farms predominate in this district, according to the Montana Extension Service; namely, (1), the small all-tillable general farm, (2), the larger specialized wheat farm particularly adapted to low cost methods, and, (3), the farming-grazing farms where tillable land is combined with rougher grazing land. The Extension Service makes the following recommendations:

1. On the smaller farms where all the land is tillable, though wheat is the important cash crop, feed crops and livestock production are essential to provide needed cash returns. A comparatively intensive system of farming is necessary for this type of farm. Men with more managerial ability may profitably extend this type of farming to larger units.
2. Specialized wheat farms require a farm unit of at least one section and, in many cases, larger units are more profitable.
3. Labor efficiency will be increased by the use of larger teams, medium sized tractors, larger tillage implements and the combine-harvester.
4. Proper tillage methods are of the utmost importance.
5. The depletion of soil fertility through continuous cropping has not yet become a problem but may demand special attention in the near future.
6. The production of small grains for hay is recommended.
7. More hogs should be raised in the district.
8. Farms should carry at least enough stock to utilize the by-products of the farm.

ROOSEVELT COUNTY

Date of Creation	Feb. 18, 1919	Est. County Population Jan. 1, 1928	11,513
Land Area,	2,383 sq. miles	Population 1920,	10,347
County Seat,	Wolf Point	Population of County Seat	2,098
Altitude County Seat,	2,101 feet	Growing Season,	April to October

By Charles Gordon

ROOSEVELT County is 84 miles long and averages 25 miles wide. It lies in northwestern Montana. The North Dakota boundary marks its eastern and the Missouri River its southern boundaries. It is exclusively an agricultural and stock raising county. While non-irrigated farming predominates, several thousand acres on the Fort Peck Indian Reservation reclamation project are irrigated and several thousand acres are irrigated by private interests. Its altitude is the lowest in the state.

Surface and Soil: A recent soil survey of Roosevelt County shows that there is a varying classification of soil on its rolling prairie glaciated formation; that 52% of the 1,505,920 acres is high class tillable land, while 48% is classified as grazing land of the better type. The soils consist of the sandy loam type in the eastern part and in the western and northern districts the sandy and clay loams prevail.

Crops: Fifty-two percent of the 1,505,920 acres of Roosevelt county land areas are tillable and productive land; of this 730,784 tillable acres, approximately 300,000 acres are under cultivation. Wheat and flax are the two main cash crops of the county. The corn acreage which was formerly estimated to be 18,000 has dropped to 16,000 acres in the past two years due to the increased use of barley as a feed crop. Cattle, both beef and dairy, and hogs are the main sources of revenue from live stock, there being 100 percent and 300 percent increase in those products, respectively, over a period of five years. There has been an increase in farms in the last few years.

Drainage and Water Supply: The Missouri River, forming the south boundary of the county, and its smaller tributaries, flowing in the general direction of northwest to southeast, constitute the drainage. These tributaries consist of the Poplar River, the Big Muddy, Wolf Creek, the Little Muddy, Little Wolf, Touley Creek, Shotgun and Sheep Creeks. The irrigation acreage approximately consists of 10,594 on the Poplar River, 4,394 acres on the Big Muddy partly completed, and two proposed areas of 83,588 acres called the Missouri River gravity and 10,000 acres called the Galphin bottom pumping.

Industries: Agriculture, consisting chiefly of live stock and crop production, are the main industries of the county. There is, however, one flour mill and bottling works at Wolf Point, and bakeries at Poplar, Culbertson, and Wolf Point.

Mineral Resources: There are many deposits of lignite coal throughout the entire county which furnish a supply of fuel for practically all uses in the county. In addition, the geological survey credits this territory with having two oil domes in the west central and western portion of the county.

Timber: The main channel of the Missouri River, consisting of the whole Missouri River bottom, is heavily wooded and furnishes ample timber supply for all local uses. Many farmers have secured shelterbelt plantings for their farmsteads and find that trees make a very satisfactory growth.

Land Value: Land is valued at $2.50 to $40, depending entirely on its productive value and location. There are, however, thousands of acres of low priced land that have proven to be, under proper tillage methods, very productive. Experience records show that thousands of acres of $5 land are producing an average of 25 bushels of wheat to the acre, under proper methods, over a period of four years.

Transportation and Highways: The main line of the Great Northern traverses the entire county and the branch line running to Scobey and Opheim bisects the eastern portion. The Roosevelt Highway runs approximately parallel to the Great Northern Railway. This is either graveled or plans for graveling will be completed in a few years. Forty miles of said project are already completed. The Powder River trail forms a north and south trail in the extreme west of the county going through Wolf Point; the R-Y Trail in the west central portion traversing Poplar. The Roosevelt Highway is graded the entire length of the county and with a portion of road graveled between Culbertson and Froid provides a good primary road system. The Canadian-Mexican Highway through Froid, Culbertson and Bainville provides north and south connections with the Roosevelt Highway.

Education: Six modern high schools and ample public school facilities in both town and rural communities put Roosevelt County on a high plane from an educational standpoint.

Cities and Towns: There are five main towns: namely, Wolf Point in the extreme west, Poplar in the west central part, Culbertson in the east central part, Bainville in the eastern portion, and Froid in the northeastern portion. Wolf Point is the county seat and division of the Great Northern Railway; Poplar is the headquarters of the Fort Peck Indian Reservation; Bainville is the junction of the main line and the Scobey branch, and all of these towns are active farm trading centers. In addition to these trading centers, the village of Mondak in the extreme east, McCabe in the east central and Brockton in the south central form other trading centers that are of great value to farmers in marketing their products and buying supplies.

Climatological: Average precipitation, 14 inches; average frost-free period, 120 days; climate ideal for the production of high quality spring wheat and hardier seed crops as well as live stock and live stock products. A high percentage of corn has matured seven years out of the last nine and a fair percentage the other two years.

Crop Production: The total value of all crops produced in 1927 was $4,163,360. Roosevelt county placed fourth in production of rye and fifth in corn. The crops are as follows: Spring wheat 152,000 acres, acre yield 17, production 2,601,000 bushels, value $2,522,970; winter wheat 4,000 acres, acre yield 16, production 64,000 bushels, value $58,880; all wheat 156,000 acres, acre yield 17.1, production 2,665,000 bushels, value $2,581,850; oats 25,000 acres, acre yield 35, production 875,000 bushels, value $385,000; barley 3,200 acres, acre yield 26, production 83,200 bushels, value $49,920; rye 9,000 acres, acre yield 15, production 135,000 bushels, value $98,550; flaxseed 15,200 acres, acre yield 9.5, production 144,400 bushels, value $252,700; corn 16,000 acres, acre yield 21, production 336,000 bushels, value $241,920; potatoes 600 acres, acre yield 120, production 72,000 bushels, value $46,800; beans 350 acres, acre yield 18, production 6,300 bushels, value $18,900; alfalfa seed 100 acres, acre yield 2.0; production 200 bushels, value $2,600; all tame hay 12,000 acres, acre yield 1 9, production 22,800 tons, value $191,520; wild hay 32,500 acres, acre yield 1.17, production 38,000 tons, value $285,000; truck crops and vegetables $8,600.

Livestock: The total value of livestock products marketed in 1927 was $1,331,100. Combined crops and livestock totaled $5,494,460.

Value of Industries: The estimated value of manufacturing in 1927 was $212,000 and tourist $210,000.

Total and Per Capita Production: The total production for the county is valued at $5,916,460 and per capita production for 1927 at $514.

Real estate, with improvements, was assessed in 1927 at $8,647,247. Livestock was assessed at $759,796, and public utilities at $6,229,875. The total assessed value of all property was $17,549,415, with a taxable value of $5,831,939. The tax rate for county purposes was 35.5 mills on the taxable valuation. For school purposes, the levy averaged 40.36 mills. The tax for all purposes on farm and grazing land averaged 22 6 cents an acre, on horses 73.4 cents, on cattle 82.2 cents a head and on sheep 26.8 cents.

The net indebtedness of Roosevelt county has decreased more than 25 percent during the last three years. It dropped from $885,932.25 June 30, 1924, to $635,355.27 on the same date in 1927. Due mainly to the fact that reservation lands are not taxable until final proof is made, yet school facilities for children of settlers must be provided, the district school indebtedness increased appreciably during the same period. June 30, 1927, this indebtedness, net, amounted to $419,421.70. The per capita net debt for county and school purposes is $101.94.

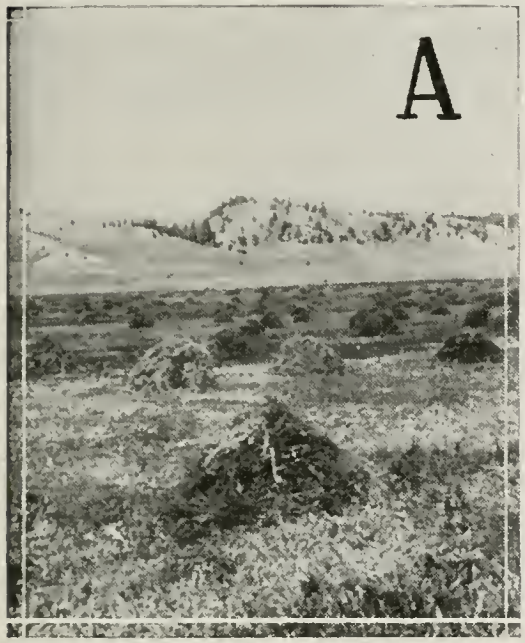
The county agent is located at Culbertson.

Additional Information: For more detailed information about the resources of Roosevelt county, write to the secretary of the Commercial Club, Wolf Point, Montana.

PHILLIPS COUNTY

Date of Creation	February 5, 1915	Est. County Population Jan. 1, 1928	7,476
Land Area	5,279 sqare miles	Population, 1920	9,760
County Seat	Malta	Population County Seat, 1920	1,427
Altitude County Seat	2,248 feet	Growing Season	119 days

By T. J. Larson.



A NEW COUNTY agriculturally, Phillips is making steady progress, and in time will no doubt prove to be one of the leading agricultural counties of the State. Extending from the Canadian boundary on the north to the Missouri River on the south, Phillips County lies in the north central part of Montana and is approximately 101 miles long north and south and 66 miles wide east and west.

Surface and Soil: The county is practically all prairie in character, with the exception of the Little Rocky Mountains in the southwestern part of the county. Soil types are quite uniform, varying from clay loams along the valley of the Milk River to sandy loams on the uplands. Much of the land in the south half of the county is rolling and broken, especially adapted to grazing purposes.

Crops: Wheat is the principal crop on the non-irrigated sections, and blue joint hay on the irrigated lands. Acreage devoted to corn is gradually increasing while oats, flax, alfalfa, corn, beans and sugar beets are all profitable crops. The new sugar beet industry has brought in many new families from Idaho and Utah, who have permanently settled in the Milk River Valley. Alfalfa seed and seed potatoes are becoming an important factor in the growth of the county.

Drainage and Water Supply: The Milk River is the principal source of irrigation. Many tributaries rising in the Little Rockies flow into it from the south, and it is fed by many small streams from the north. Water for domestic purposes is obtained from wells.

Industries: Agriculture and stock raising are the principal industries. Sheep are raised on an extensive scale. Considerable gold mining is done in the Little Rockies.

Mineral Resources: The Little Rockies in Phillips County have produced gold and silver for many years. There are extensive lignite coal deposits in the county and some oil drilling has been done within the past two years, although oil in commercial quantities has not yet been produced.

Timber: In the southwestern part of the county is located the Jefferson National Forest in which some timber of commercial value is found. Cottonwood is also found along the Missouri and Milk Rivers.

Land Values: Improved irrigated lands sell for about $75 per acre; improved non-irrigated for $25; non-improved lands for $15, and grazing land for $10 per acre.

Transportation and Highways: The main line of the Great Northern passes through the county from east to west, following along the Milk River most of the way. The Theodore Roosevelt Highway parallels the Great Northern. Another important highway is the Dominion-Yellowstone Trail from Swift Current to Yellowstone National Park, via Malta and Lewistown. A new branch of the Great Northern Railway is being constructed from Saco to Turner through the northern part of the county this year.

Education: There are three accredited high schools in the county and 112 grade schools in which are employed a total of 146 teachers. The Phillips county library located at Malta, has 7,500 volumes, with 20 branches and 45 school stations.

Cities and Towns: Malta, the county seat, is an up-to-date community and chief trading center. Other towns tributary to large farming districts are Bowdoin, Saco and Dodson.

Climatological: According to the weather bureau station at Whitewater, the average temperature is 38.9 degrees and the average annual precipitation is 12.88 inches. Observations of seven years record a frost-free period of 107 days.

Crop Production: The value of all crops in Phillips county totaled $3,309,458, divided as follows: Spring wheat 80,000 acres, acre yield 22, production 1,760,000 bushels, value $1,707,200; winter wheat 1,000 acres, acre yield 16, production 16,000 bushels, value $14,720; all wheat 81,000 acres, acre yield 21.9, production 1,776,000 bushels, value $1,721,920; oats 24,000 acres, acre yield 40, production 960,000 bushels, value $422,400; barley 5,000 acres, acre yield 31, production 155,000 bushels, value $93,000; rye 7,000 acres, acre yield 20, production 140,000 bushels, value $102,200; flaxseed 4,600 acres, acre yield 10, production 46,000 bushels, value $80,500; corn 10,000 acres, acre yield 23, production 230,000 bushels, value $165,600; potatoes 600 acres, acre yield 150, production 90,000 bushels, value $58,500; beans 300 acres, acre yield 10, production 3,000 bushels, value $9,000; alfalfa seed 250 acres, acre yield 1.7, production 425 bushels, value $5,525; clover seed 50 acres, acre yield 3.3, production 165 bushels, value $2,475; all tame hay 16,000 acres, acre yield 2.5; production 40,000 tons value $336,000; wild hay 35,400 acres, acre yield 1.0, production 35,400 bushels, value $265,500; truck crops and vegetables, value $3,700, and sugar beets 550 acres, acre yield 9.25, production 5,075 tons, value $43,138.

Livestock: Livestock products marketed in 1927 totaled $1,694,100. Combined crops and livestock were $5,003,558.

Value of Industries: The estimated value of manufacturing in 1927 was $203,000. The value of lumbering was $2,325 (includes value of lumber cut only. Value added by manufacture not included), and tourist $150,000.

Total and Per Capita Production: The total production for the county is valued at $5,358,883 and the per capita production for 1927 at $717.

The assessed value of real estate and improvements in 1927 was $14,201,600; livestock, $1,552,100, and public utilities, $3,049,200. Total value of all property was $19,963,044 with a taxable value of $6,304,364. The county tax rate was 34 mills on the dollar of taxable valuation, and the average rate for school purposes was 31.01 mills. The average general tax rate for all purposes was 15 cents an acre on farm and grazing lands, 32.6 cents a head on horses, 67.8 cents a head on cattle and 22.0 cents a head on sheep.

The net debt of the county June 30, 1924, was $606,925.45. June 30, 1927 it was 498,-887.14, a 17 per cent reduction. The total net debt of school districts June 30, 1927, was $301,225.20, making a per capita net debt of $85.93 for county and school purposes on that date.

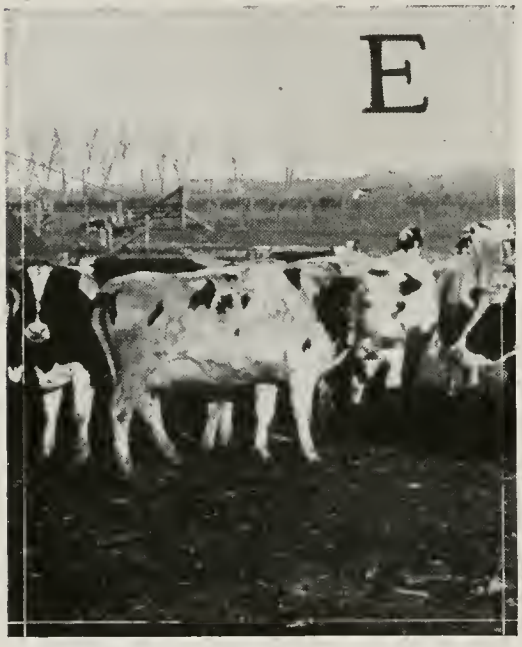
Phillips county has a county extension agent located at Malta.

Additional Information: For more detailed information regarding the resources of Phillips county write to the Commercial Club, Malta, Montana.

SHERIDAN COUNTY

Date of Creation,	March 27, 1913	Est. County Population Jan. 1, 1928.	10,418
Land Area,	1,720 sq. miles	Population 1920,	13,847
County Seat,	Plentywood	Population County Seat,	888
Altitude County Seat,	2,046 feet	Growing Season,	98 to 106 days

By T. W. Greer.



EARLY history of this territory dates back to the Lewis and Clark expedition to the Northwest in 1804-6, and the main industry followed was hunting and trapping. With the building of railroads in 1882-88 stock raising became the chief industry. About 1908 settlement of the public lands began. The greatest influx of settlers came after the year 1910. In 1910 to 1913 two railroads were built through the county, one extending from Bainville and making a wide detour through the northern part of the county; the other was built through the northern part of the county. Few counties in the State have experienced a more rapid development. There are no mountains in Sheridan county and three-fourths of the land is tillable.

Surface and Soil: The soil of Sheridan County is of glacier origin which covers the county to about an average depth of 20 feet. This glacial drift lies upon the eroded surface of the Fort Union geological formation from which a supply of lignite coal is obtained. The largest part of the soil, which is classified as Williams loam, is very easily worked into a friable condition, contains a large amount of organic matter and is very productive. The water-holding capacity of the soil is good.

Drainage and Water Supply: Sheridan County is drained by the Big Muddy River and its tributaries. The county is well covered with streams which will easily drain any surplus of water. The water supply is very good. Good water can be obtained at a depth of 15 to 150 feet.

Industries: The chief industries of Sheridan County at the present time are the raising of grain crops and stock raising. In the last few years dairying has become quite important, experienced Eastern dairy farmers finding that they can raise more feed and cheaper feed on our productive, low priced land and place their products on the consumer's market more economically than they can when operating Eastern farms. Poultry raising, hog raising, and bee keeping are also becoming of increasing importance.

Mineral Resources: Practically the entire county is underlain with deposits of lignite coal. There are also large deposits of pottery, brick and tile clay of exceptional quality; strong indications of oil and gas and large depcsits of aluminum, clay, silica, and thorium.

Land Values: Land values range from $50 an acre for choice, favorably located agricultural land to $5 an acre for lands suitable for grazing.

Transportation and Highways: Two railroad lines give daily service throughout Sheridan county. There is also a good system of graded roads netting its area and additional graded roads are being built at the rate of approximtely 150 miles per year.

Education: There are 93 schools in the county, including seven approved high schools, employing 141 teachers and having an enrollment of 2,695 pupils.

Cities and Towns: There are five incorporated towns and ten unincorporated villages or towns furnishing railroad accomodations and markets to the inhabitants.

Climatological: The normal precipitation is in the neighborhood of 17 inches per year. However, about 60 per cent of it is received during the growing season from April 1 to August 1. There are very rarely extreme weather conditions either in winter or summer.

Crop Production: Sheridan county placed first in flax, first in oats, second in spring wheat, third in rye and fourth in all wheat produced in 1927. The total value of all crops was $6,353,096, giving the county third place. Individual crops are as follows: Spring wheat 231,000 acres, acre yield 19, production 4,389,000 bushels, value $4,257,330; winter wheat 2,000 acres, acre yield 15, production 30,000 bushels, value $27,600; all wheat 233,000 acres, acre yield 19, production 4,419,000 bushels value $4,284,930; oats 38,000 acres, acre yield 37, production 1,406,000 bushels, value $618.640; barley 5,500 acres, acre yield 23, production 126,500 bushels, value $75,900; rye 8,700 acres, acre yield 16, production 139,200 bushels, value $101,616; flaxseed 36,000 acres, acre yield 10.5, production 378,000 bushels, value $661,500; corn 12,000 acres, acre yield 24, production 288,000 bushels, value $207,360; potatoes 800 acres, acre yield 110, production 88,000 bushels, value $57,200; beans 300 acres, acre yield 18, production 5,400 bushels, value $16,200; alfalfa seed 75 acres, acre yield 2.0, production 150 bushels, value $1,950; all tame hay 15,000 acres, acre yield 1.6, production 24,000 tons, value $201,600; wild hay 22,700 acres, acre yield .75, production 16,600 tons, value $124.500; truck crops and vegetables $1,700.

Livestock: The value of livestock products marketed in 1927 totaled $779,200. In combined crops and livestock Sheridan county placed fourth with a total of $7,132,296.

Value of Industries: The estimated value of manufacturing was $320,000. The value of coal mining was $61,710 and tourist $195,000.

Total and Per Capita Production: The total production for the county is valued at $7,709,006 and per capita production for 1927 at $740.

The value of Sheridan county's real estate and improvements, as set forth in 1927 assessments, is $14,207,894. The value of the livestock is $974,952, and the value of public utilities, $2,467,248. The total value of all property is $20,260,737. The taxable value is $6,183,993.

The tax rate for county purposes last year was 29 mills on the dollar of taxable valuation. The average levy for school purposes was 37.05 mills. The tax for all purposes on farm and grazing lands was 27.3 cents an acre, on horses 64.8 cents a head, on cattle 79.1 cents a head and on sheep 21.8 cents.

The net debt of the county was $568,603.04 June 30, 1924. By June 30, 1927, this had been reduced to $464,178.54. By "net debt" is meant the gross debt less cash on hand and in funds available to pay same.

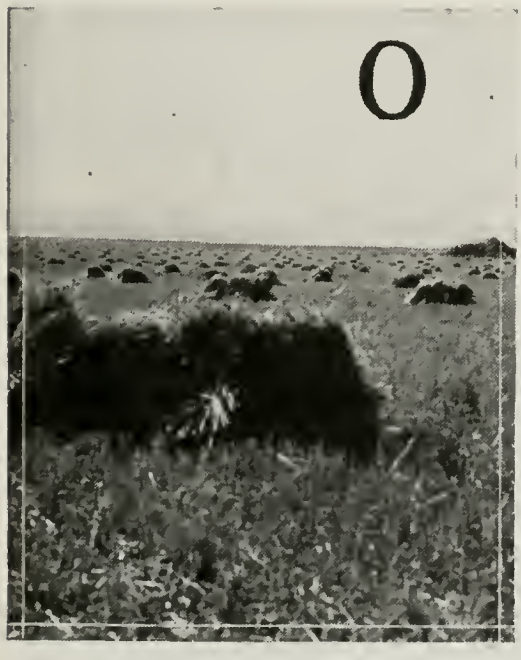
The net indebtedness of school districts decreased from $215,500.66 to $164,265 83, or nearly 24 per cent during the same three-year period. The per capita net debt for the county and school purposes was $67.02 June 30, 1927.

Additional Information: For more detailed information about the resources of Sheridan County write to the Secretary of the Commercial Club, Plentywood, Montana.

VALLEY COUNTY

Date of Creation	1893	Est. County Population Jan. 1, 1928	13,802
Land Area	5,064 sq. miles	Population, 1920	10,500
County Seat	Glasgow	Population County Seat, 1920	2,059
Altitude County Seat	2,088 feet	Growing Season	May 20 to Sept. 10

By Samuel L. Rugg.



ONE OF the largest counties of the State in area, Valley County is making rapid progress along agricultural lines. The county reaches from the Canadian border on the north to the Missouri River, a maximum distance of 100 miles. It is about 65 miles wide. A considerable acreage of irrigated land is still idle and projects under construction will more than double the amount of land now under water.

Surface and Soil: Aside from the bottom lands along the Missouri River that part of the county north of the Missouri and south of the Milk River is almost too rough and cut up by badlands to be adapted to anything but stock raising. The irrigated lands under the U. S. Milk River Irrigation Project lie almost wholly within the Milk River Valley and west of the confluence of the Milk and the Missouri along the Milk River. Soil types vary from silt and clay loams in the bottoms, to sandy and gravelly loams on the uplands. The well drained clays and clay loams which cover the greater part of the irrigated areas are the most fertile soil.

Crops: Due to the wide range of soil types and large acreage of both irrigated and bench lands, the crops of wheat, oats, flax, barley, and corn, alfalfa, potatoes, and beans are sought by outside agencies for seed purposes, the quality of these crops being exceptionally high. Much attention is also being given to dairying.

Drainage and Water Supply: The Missouri River, the Milk River and tributaries provide adequate water for all purposes.

Industries: Diversified farming and the raising of live stock are the principal industries of the county. A co-operative creamery has been established at Glasgow. There are also two flour mills.

Mineral Resources: Coal is found in some parts of the county and also brick clay. Drilling for oil is now under way.

Timber: There is no commercial timber in the county. Cottonwoods are found along the rivers and streams.

Land Values: Improved irrigated lands, $40 to $65 an acre; improved non-irrigated land, $20 to $40 an acre; non-improved cultivable lands, $15 to $35 an acre, and grazing land, $8 to $12 an acre.

Transportation and Highways: The main line of the Great Northern follows the Milk River Valley through the county. Auto stages run from Glasgow north. The Theodore Roosevelt Highway passes through the county, following the railroad. Graded roads extend from Glasgow to the Canadian line.

Education: There are 112 schools in the county, including four high schools. The total enrollment is 2829.

Cities and Towns: Glasgow, the county seat, is the largest town in northeastern Montana. It has all modern municipal improvements. Other towns are Oswego, Frazer, Nashua, Hinsdale on the Great Northern Railway, and Opheim and Glentana, 55 miles north of Glasgow, on the Great Northern branch.

Climatological: According to the weather bureau station at Glasgow, the average normal temperature is 40.5 degrees and the normal annual precipitation is 13.61 inches. Observations of 28 years record a frost-free period of 119 days.

Crop Production: The value of all crops in Valley county in 1927 totaled $4,980,901. Production and value are as follows: Spring wheat 162,000 acres, acre yield 20, production 3,240,000 bushels, value $3,142,800; winter wheat, 4,000 acres, acre yield 18, production 72,000 bushels, value $66,240; all wheat 166,000 acres, acre yield 20, production 3,312,000 bushels, value $3,209,040; oats 29,000 acres, acre yield 35, production 1,015,000 bushels, value $446,600; barley 6,000 acres, acre yield 25, production 150,000 bushels, value $90,000; rye 2,500 acres, acre yield 15, production 37,500 bushels, value $27,376; flaxseed 18,800 acres, acre yield 10, production 188,000 bushels, value $329,000; corn 12,000 acres, acre yield 25, production 300,000 bushels, value $216,000; potatoes 700 acres, acre yield 100, production 70,000 bushels, value $45,500; beans 350 acres, acre yield 20, production 7,000 bushels, value $21,000; alfalfa seed 300 acres, acre yield 1.0, production 300 bushls, value $3.900; clover seed 50 acres, acre yield 7.0, production 350 bushels, value $5,250; all tame hay 23,000 acres, acre yield 2.3, production 52,900 tons, value $444,360; wild hay 15,100 acres, acre yield 1.2, production 17,500 tons, value $131,250; truck crops and vegetables, value $7,800, and sugar beets 75 acres, acre yield 6.0, production 450 tons, value $3,825.

Livestock: Livestock products marketed in 1927 totaled $1,956,500. Combined crops and livestock were $6,937,401.

Value of Industries: The estimated value of manufacturing is $150,000 and tourist $205,000.

Total and Per Capita Production: The total production for the county is valued at $7,292,401 and per capita production for 1927 at $528.

Valley county has a county extension agent and a home demonstration agent, both located at Glasgow.

Real estate and improvements were assessed in 1927 at $17,815,585, livestock at $1,850,054 and public utilities at $4,527,414. The total value of all property was $27,049,166, with a taxable value of $8,461,304.

The tax rate for county purposes last year was 24 mills on taxable valuations, and the average rate for school purposes was 30.72 mills. Taxes for all general purposes averaged 15.8 cents an acre on farm and grazing lands, 42.6 cents a head on horses, 59.1 cents a head on cattle, and 18.3 cents a head on sheep.

Net indebtedness of the county is being consistently and rapidly reduced. During the three years ending June 30, 1927, it was cut from $611,244.42 to $430,715.27, nearly 30 percent. During the same period, school districts reduced their total net debt from $221,113.03 to $198,555.76, about 10 percent. The per capita net debt for county and school purposes was $59.74, just about the state average, June 30, 1927.

Additional Information: For more detailed information about the resources of Valley county write to the Chamber of Commerce, Glasgow, Montana.

DANIELS COUNTY

Date of Creation,.....May 11, 1920
Land Area,.....1,440 sq. miles
County Seat,..... Scobey
Est. County Population Jan. 1, 1928....6,516
Population County Seat, 1927,.....1,270
Altitude County Seat,.....2,450 feet

By F. H. Smith

SITUATED in the northeastern part of Montana, Daniels county lies between Fort Peck Indian Reservation on the south and the Canadian line on the north. It roughly includes an area of 51 townships of very fertile territory devoted almost exclusively to grain and live stock production. Though small in area, Daniels County produces a vast amount of grain for shipment, marketing over three million bushels of wheat alone in 1927. This area was formerly a range country. Following 1910, when the territory was thrown open for homesteading, it was rapidly settled and has been converted into an important grain raising section.

Surface and Soil: The surface of Daniels County is level to gently rolling with few areas too rough for profitable farming. The soil varies from a heavy glacial deposit to the lighter phases of sandy loam, which are found upon higher benches. In the glacial areas, Niggerheads and Granite boulders are mixed with the surface soil. All types of soil produce grain crops successfully.

Crops: Wheat, flax, rye, oats and barley are the main crops grown. Of these wheat furnishes pratically 75 per cent of the cash income. Flax has been grown extensively on the newly broken sod, but is now being grown on older land with very good results. For feed crops, oats and barley are very dependable and give a high quality of feed. The Flint variety of corn is grown successfully for hog feeding. Alfalfa, sweet clover, brome grass and rye grass are used extensively for domestic hay and pasture.

Drainage and Water Supply: Daniels County is drained by the Poplar River and its tributaries, except for a small area in the eastern part of Daniels County which drains into the Big Muddy. Ample water for stock is supplied by streams. Water for domestic use is readily supplied by wells from 20 to 150 feet in depth. Most of the water is of very good quality and little difficulty is experienced in locating wells in any section of the county.

Industries: Agriculture is the principal industry of the county.

Mineral Resources: Thousands of acres of Daniels County are underlain with lignite coal which is mined at depths from 5 to 120 feet.

Land Values: Land in this county can be bought at very reasonable prices. Well improved tracts 10 to 15 miles from town can be secured at $20.00 per acre and up. A vast acreage of State land in the western part of the county is available for sale at the State land sales held every two or three years.

Transportation and Highways: Railways touching Daniels County include the Great Northern and the Soo lines. Whitetail, in the northeastern part of the county, is the terminus of the Soo. Scobey, the county seat, has been the terminus of the Great Northern for ten years. At present this branch has been extended to Opheim, in the county west of Daniels. A good system of highways is being constructed as finances permit. All of the main roads of the county are graded and attention is being given to less important roads. State highway specifications are being followed in all construction work. Nine miles of State highway are being constructed in 1928 in addition to an ambitious road building program that has been planned by the county commissioners. There are at present 485 miles of graded roads in the county.

Education: A very efficient system of district schools in the rural sections and graded schools is maintained in Whitetail, Flaxville, Madoc, Scobey and Peerless. Scobey, Flaxville and Whitetail maintain four years of high school work. There are 47 schools in the county with an enrollment of 1,489.

Cities and Towns: Scobey, Whitetail and Flaxville are the principal towns. Other towns are Peerless, Madoc and Navajo. A new town is being built at Four Buttes.

Crop Production: Crop production in Daniels county in 1927 is valued at $4,601,935, divided as follows: Spring wheat, 175,000 acres, acre yield 19, production 3,325,000 bushels,, value $3,225,250; winter wheat 5,000 acres, acre yield 15, production 60,000 bushels, value $55,200; all wheat 180,000 acres, acre yield 18.8; production 3,385,000 bushels, value $3,280,450; oats, 29,000 acres, acre yield 40, production 1,130,000 bushels, value $497,200; barley, 4,400 acres, acre yield 30, production 132,000 bushels, value $79,200; rye, 4,000 acres, acre yield, 19.5, production 78,000 bushels, value $56,940; flaxseed, 26,200 acres, acre yield 9.2, production 241,000 bushels, value $421,750; corn, 4,000 acres, acre yield 26, production 104,000 bushels, value $74,880; potatoes 500 acres, acre yield 125, production 62,500 bushels, value $40,625; alfalfa seed, 75 acres, acre yield 2.0, production 150 bushels, value $1,950; all tame hay, 6.000 acres, acre yield 2.1, production 12,600

tons, value $105,840; wild hay 6,700 acres, acre yield .6, production 5,400 tons, value $40,500; truck crops and vegetables, value $2,600. Daniels county took second place in value of oats, third place in flax and ninth in value of all crops produced.

Livestock: Livestock products marketed in 1927 totaled $458,500. Combined crops and livestock totaled $5,060,435.

Value of Industries: The estimated value of the various industries of the county for 1927 is as follows: Manufacturing $112,000. The value of coal mined is $22,057 and tourist $150,000.

Total and Per Capita Production: The total production for the county is valued at $5,344,492 and per capita production for 1927 at $818.

The assessed valuation of all property in Daniels county in 1927 was $12,068,411, value of real estate and improvements making up three-fourths of this total. Livestock was valued at $607,000 and public utilities at $1,066,000. The total taxable valuation was $3,655,559. The county tax rate last year was 36 mills on the taxable valuation and the average levy for school purposes was 36.61 mills. The average tax on farm and grazing land was 26.9 cents an acre; on horses it was 67.2 cents a head, cattle 80.6 cents and on sheep 22.9 cents.

A sizeable debt was assumed when Daniels cut off from the parent county, a few years ago but the debt is diminishing rapidly. The net county debt in 1924 was $358,740. June 30, 1927 it was $238,631.45 a reduction of more than one-third during the three-year period. School districts have done almost as well, reducing their net debt from $178,600.88 to $117,012.08 during this time. The per capita debt for county and school purposes was $98.05 in 1924. June 30, 1927, it amounted to only $64.90. This is a percentage of reduction few counties can equal.

Daniels county has a county agent located at Scobey.

Additional Information: For more detailed information about the resources of Daniels county, write to the county agent or the Commercial Club, Scobey, Montana.

NORTH CENTRAL MONTANA

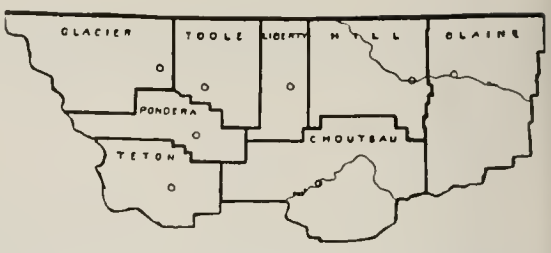
Farming, Stockraising, Oil and Coal Production Are the Chief Industries —Eastern Half of the Glacier National Park on Western Border—Most of the Area in Plains Region.

Including within its area the eastern half of the Glacier National Park the North Central district stretches far eastward. Most of it is included within the plains region, but the western part and some isolated mountain ranges belong to the eastern slopes region.

The district includes the counties of Glacier, Toole, Liberty, Hill, Blaine, Pondera, Teton and Chouteau.

The only irrigated district of any size in the eastern part is in the Milk River valley. There is considerable irrigated land in the western part, and the reclamation of more is projected. Non-irrigated farming predominates. Moisture has been the chief factor limiting crop production. Improved methods of tillage especially adapted to conditions of the section have resulted in a tendency toward stability of yields and in 1927, combined with favorable weather conditions, enabled the counties of North Central Montana to take a leading place in crop production in the state. Chouteau county led the state in all wheat production in 1927, Hill county was third and Teton fifth. In the value of all crops produced Chouteau stood fourth and Hill fifth. The district is an important producer of flax, rye, and barley as well as wheat. In the irrigated districts of the Milk River valley, sugar beets form the staple crop for a majority of the farms.

Eighteen and three-tenths per cent of all land in farms in Montana is in this district and 17 per cent of all crops are produced here. The district



produces 42 per cent of the rye raised in the state, 26 per cent of the spring wheat, 24 of all wheat, 18 of barley, 15 of winter wheat, 13 of wild hay, 11 of potatoes, 10 of sugar beets, twelve of oats, nine of corn, eight of all tame hay, seven of alfalfa hay, five of flax, and three per cent of the dry beans.

Stock raising is still the most important producer of wealth for the wide grazing areas in the western and southern parts which are not suited to crop production. Direct marketing of feeder livestock to the feed lots of the corn belt is an established practice. A combination of wheat production and feed and stock raising is the most successful farming enterprise, according to the Montana Experiment Service. Officials of the service recommend for North Central Montana agriculture:

Farm units of approximately two sections with at least one-third of crop land in summer fallow and approximately one section planted to wheat each year.

Corn, small grain feeds and sweet clover produced in sufficient quantity for the amount of livestock on farm.

Summer tillage, especially duckfoot summer fallow, is now proving successful under many different conditions in the district.

Industrially, this section of the state is very young although extensive oil deposits are now bringing industrial activity. Toole county, the state's chief producer of crude oil, stands seventh among counties in the value of all industries, due to a production of $5,869,299 worth of crude oil in 1927. From the same fields, gas for commercial and domestic use is furnished not only to cities in the immediate vicinity but to Great Falls, in Cascade county, 100 miles distant. Both Blaine and Hill counties have available deposits of natural gas which is piped to nearby cities.

Other industrial activities include a beet sugar factory at Chinook, oil refineries at Havre and Shelby, and flour mills.

TOOLE COUNTY

Date of Creation	May 7, 1914	Est. County Population Jan. 1, 1928	4,908
Land Area	1,945 square miles	Population 1920	7,000
County Seat	Shelby	Population County Seat	2,500
Altitude County Seat	3,283 feet	Growing Season	93-106 days

By W. E. Moser.

TOOLE county leads the state in the production of petroleum. The Kevin-Sunburst field, which lies about 20 miles north of Shelby and 15 miles south of the Canadian boundary in Toole county, has maintained second place in the Rocky Mountain States since May, 1925, being exceeded only by the Salt Creek field. The field is easily accessible, being crossed by a branch of the Great Northern Railway that leaves the main line at Shelby and runs north through Kevin, Sunburst and Sweet Grass. The total production of the Kevin-Sunburst field to March 1, 1928, was over 15,000,000 barrels. The daily production at this time was 10,000 barrels, from 866 producing wells.

There are five completed refineries in operation in the county. The International and Snow Cap are located at Sunburst, Shelby Pipe Line Refining Co. at Shelby, The Big West Oil Co. at Kevin and the Toole County Refinery at Oilmont.

At the present time the development of the gas resources is receiving considerable attention. Pipes being laid for the transmission of gas to Great Falls are nearing completion. At present there is 150,000,000 ft. of gas developed with an average of 300 lb. rock pressure. Gas produced south of the oil field is now being used throughout the county for domestic fuel, for the creation of electrical power and as fuel for drilling.

Toole county lies in north central Montana. It extends southward from the Interna-

tional boundary an average distance of 50 miles, and is about 40 miles wide, east and west. Save for the northeastern quarter where the Sweet Grass Hills, an isolated mountain range, arise, the topography is rolling prairie and bench lands. The oil field lies in a treeless plain, bounded on the north and west by a bold escarpment that is capped by the formation known as the Virgelle sandstone.

Surface and Soil: Much of the surface of the field is covered by gravel and boulders, or by lake deposits, the result of the invasion of the area by glaciers. Soil types range from sandy and gravelly loams to heavier types of clay and heavy clay loams in the Marias River district in the southern part.

Crops: Spring wheat is the principal crop, followed by oats and tame hay. In the eastern and southern districts acclimated varieties of corn do fairly well and provide forage for livestock.

Drainage and Water Supply: The Marias is the only stream of any size. The city water supply for Shelby is piped seven miles from wells sunk along the banks of this stream. No permanent streams exist within the oil fields. Water for drilling is collected in reservoirs made by damming gullies and ravines or is hauled in from Shelby.

Land Values: Land values vary greatly throughout the county. The ordinary values of unirrigated land is from $15 to $20 an acre, while in the oil fields some land has sold for as high as $50,000 for a small acreage.

Transportation and Highways: Transportation facilities are very good. The main line of the Great Northern crosses the county east and west. The Burlington-Great Northern line from the south connects with the main line at Shelby, and a branch line of the Great Northern runs north from Shelby to the Canadian border, where it connects with the Canadian Pacific. Shelby is now the terminal for two trains. The Great Northern Railway Company is building a roundhouse here and is laying a Y track to take care of repair work for local needs. The depot will be enlarged in the near future.

The Roosevelt Highway follows the main line of the Great Northern and the Montana-Alberta Highway from Great Falls to Lethbridge and parallels the railway north and south through the county. An extensive gravelling of the road leading north through the oil fields has just been completed.

Education: There are four high schools in the county, located at Shelby, Sweet Grass, Galata, and Sunburst. Shelby, Sweet Grass and Galata have fully accredited four-year high school courses. The high school course in Shelby includes commercial, home economics, music, and college preparatory. There are four school buildings in Shelby and 48 schools in the county.

Cities and Towns: Shelby is the county seat and is an incorporated city with a population in the spring of 1928 of 2,500. It is the largest town, the headquarters for the oil industry and the principal distributing point for a large area. Shelby has experienced an unusual growth since oil was discovered. Three other incorporated towns are Kevin, Sunburst and Sweet Grass. Oilmont is a new town recently laid out in the heart of the oil field. Galata, an agricultural community, is east from Shelby on the Great Northern. Kevin and Sunburst are the largest towns in the field. Sweet Grass on the Canadian border is a port of entry.

At the present time the electrification of the field, including the towns of Kevin, Sunburst and Sweet Grass is being accomplished by the Northern Utilities Company. A large addition will be made to the present power plant at Shelby.

Climatological: According to the weather bureau station at Gold Butte, the average temperature of Toole county is 40.0 degrees and the average annual precipitation is 12.12 inches. Observations of 14 years record an annual frost-free period of 108 days.

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Crop Production: The value of all crops in Toole county in 1927 totaled $1,462,110, divided as follows: Spring wheat 57,000 acres, acre yield 20, production 1,140,000 bushels, value $1,105,800; oats 6,000 acres, acre yield 40, production 240,000 bushels, value $105,600; barley 2,200 acres, acre yield 35, production 77,000 bushels, value $46,200; rye 1,300 acres, acre yield 20, production 26,000 bushels, value $18,980; flaxseed 300 acres, acre yield 9, production 2,700 bushels, value $4,725; corn 2,000 acres, acre yield 22, production 44,000 bushels, value $31,680; potatoes 300 acres, acre yield 135, production 40,500 bushels, value $26,325; all tame hay 5,000 acres, acre yield 1.8; production 9,000 tons, value $75,600; wild hay 5,400 acres, acre yield 1.15, production 6,200 tons, value $46,500; truck crops and vegetables, value $700.

Livestock: Livestock products marketed in 1927 totaled $841,500. Combined crops and livestock were $2,303,610.

Value of Industries: The estimted value of manufacturing is $221,000, petroleum $5,869,299 and tourist $210,000. Toole county takes first place in petroleum production.

Total and Per Capita Production: The total production for the county is valued at $8,603,909 and per capita production for 1927 leads the state at $1,753.

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For assessment purposes in 1927, real estate and improvements were valued at $9,225,400, livestock at $807,700, public utilities at $3,955,500 and net proceeds of oil wells at $4,060,000. The total assessed value of all property was $23,109,925, with a taxable value of $10,155,580.

The tax rate for county purposes last year was 21 mills on taxable valuations, and the average rate for school purposes was 20.07 mills. Both levies are less than the average throughout the state. Taxes for all general purposes averaged 8.8 cents an acre on farm and grazing lands, 34.3 cents a head on horses, 45.6 cents a head on cattle and 14.2 cents a head on sheep.

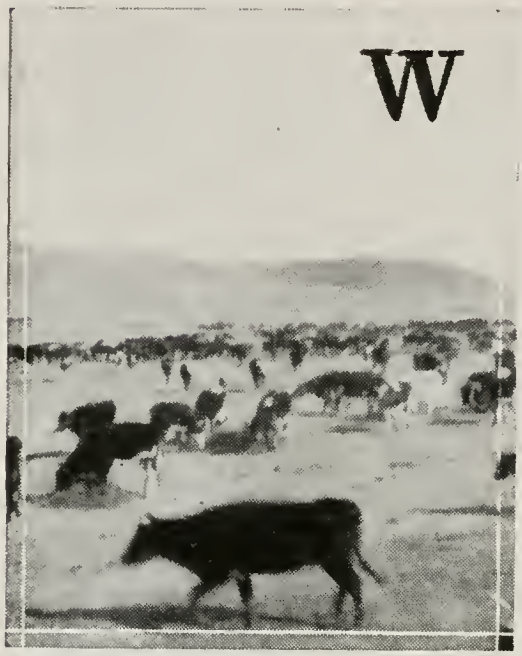
Net indebtedness of the county dropped from $488,835.88 to $397,032.48, about 19 per cent, during the three years ending June 30, 1927. The combined net debt of school districts increased somewhat during the same period, such debt amounting to $150,692.17 in 1927 as compared with $114,725.99 in 1924. The per capita net debt for county and school purposes was $78.24 June 30, 1927.

Additional Information: For more detailed information about the resources of Toole county, write the Lions Club or the Commercial Club, Shelby, Montana.

GLACIER COUNTY

Date of Creation.....April 1, 1919	Population of County Jan. 1, 1928.....5,843
Land Area.....3,045 square miles	Population of County 1920.....4,178
County Seat.....Cut Bank	Population of County Seat.....1,500
Altitude County Seat.....3,698 feet	Growing Season.....77 to 102 days

By W. F. Allison.



WHILE stock raising continues to be the leading industry of Glacier county, agriculture is rapidly becoming of importance. There are large areas of idle irrigated land in the county belonging to the Indians which can be leased or purchased at a low price.

Glacier county lies in north central Montana, the Canadian line defining its northern, and the crest of the main range of the Rocky Mountains its western boundary. It has the distinction of having within its borders Glacier National Park. Precipitous mountains occupy the western end and give way to plains sloping to the eastward, which are comparatively high in altitude. The region is well watered and the northern part, which is one of the best grass regions in the state, is ideally adapted to stock raising. The southern part of the county contains more level land and some good soil, and also has a longer growing season than the northern part.

Crops: The principal crop raised on the non-irrigated land is spring wheat, which, on account of its exceptional hardness, commands a fancy price. On the irrigated sections wheat is the principal crop, although all small grains, hay, alfalfa, and garden truck are profitable crops.

Drainage and Water Supply: Glacier is the only county in the United States which has drainage into three oceans. The waters from Triple Peak in Glacier Park flow into the Arctic, the Pacific and the Atlantic Oceans, but most of the streams are tributaries of the Milk River, which, through the Missouri, finally empties into the Gulf of Mexico. There are three large irrigation projects in the county, and many private systems, providing irrigation for many thousands of acres of land.

Industries: The principal industries of the county are cattle and sheep raising and agriculture. Dairying is rapidly coming into prominence, while the raising of hogs and poultry is proving a source of good revenue to the farmer.

Minerals: Coal has been found in the county, but mined only for local consumption. Magnetite beds, which can be traced for many miles across the reservation, are found in the western end of the county. Several oil structures are located in the county. Three rigs are located north of Cut Bank. Nineteen twenty-eight will see considerable development on other structures within the county.

Timber: The Lewis and Clark National Forest occupies 25,000 acres in the southwestern corner of the county.

Land Values: Lands are available throughout the county at prices ranging from $5 to $30 an acre. For the homeseeker of moderate means who wishes to make a change, there are many places that can be bought.

Transportation and Highways: The main line of the Great Northern runs through the county from east to west. A new State Highway, north and south, connects at Browning with the Roosevelt Memorial Highway and with the roads on the eastern side of Glacier Park.

Education: Glacier county has 14 schools, including two accredited high schools, and a total enrollment of 1,046.

Cities and Towns: Cut Bank, the county seat, is a modern town in every respect, and the railroad and trading center for Glacier county. Browning, the oldest town, is located on the national highways and is known as "The Biggest Little Town in the State." Glacier Park is the official entrance to Glacier National Park. Its population during the winter months averages about 300, and varies during the summer season from 800 to 2,500 people. Babb is the gateway to Canada, and is destined to become of considerable importance.

Climatological: The average rainfall is about 16 inches per year, thus assuring a maximum crop production. The climate in Glacier county is especially good, with short winters and cool summer nights. It will be of interest to many to learn that the summer days are very long. At 4 o'clock in the morning it is practically daylight, and work can be done as late as 9 in the evening.

Crop Production: Total crops produced in 1927 were valued at $697,650, divided as follows: Spring wheat 22,000 acres, acre yield 15, production 330,000 bushels, value $320,100; oats 4,000 acres, acre yield 40, production 160,000 bushels, value $70,400; barley 1,000 acres, acre yield 30, production 30,000 bushels, value $18,000; rye 1,300 acres, acre yield 20, production 26,000 bushels, value $18,980; flaxseed 300 acres, acre yield 10, production

3,000 bushels, value $5,250; potatoes 200 acres, acre yield 86, production 17,200 bushels, value $11,180; all tame hay 2,000 acres, acre yield 1.8, production 3,600 tons, value $30,240; wild hay 29,800 acres, acre yield 1.0, production 29,800 tons, value $223,500.

Livestock: Total livestock products marketed in 1927 were valued at $1,029,000. Combined crops and livestock totaled $1,726,650.

Value of Industries: The estimated value of manufacturing in 1927 was $25,000 and the tourist trade totaled $230,000.

Glacier county, in cooperation with Toole county, will have a county agent this year. It is anticipated that there will be more actual farming this year than ever before, most of the work being done by tractors.

Total and Per Capita Production: The total production for the county is valued at $1,981,650 and per capita production for 1927 at $339.

Real estate and improvements in 1927 had an assessed value of $4,862,000, livestock $754,000 and public utilities $4,177,144. The total value of all property amounted to $10,664,768. The taxable value was $3,615,195.

The county tax rate was 25 mills on the taxable valuation and the average levy for school purposes was 29.06 mills. The tax for all purposes on farm and grazing lands was 13.2 cents an acre, on horses 39.1 cents a head, on cattle 60.4 cents a head and on sheep 19.5 cents a head.

The county owed a net debt of $279,316.48 June 30, 1924. By June 30, 1927, this had been reduced to $240,600.95. The net indebtedness of school districts was reduced from $229,617.63 to $184,461.12 during the same period, making a per capita net debt of $101.74 for county and school purposes June 30, 1927.

Additional Information: For more detailed information about the resources of Glacier county, write to the secretary of the Commercial Club, Cut Bank, Montana.

BLAINE COUNTY

Date of Creation	March 2, 1912	Est. County Population Jan. 1, 1928	6,960
Land Area	4,271 square miles	Census 1920	9,500
County Seat	Chinook	Population County Seat	1,200
Altitude County Seat	2,400 feet	Growing Season	140 days

By G. H. Willman and Max Legge.

LOOKING SOUTH.

THE cut epitomizes the agricultural range of the county—in the foreground the bench grazing land, next the irrigated valleys, then the level wheat lands, with the Bearpaws in the distance, the mecca of the stockmen.

Blaine county extends 90 miles from Canada to the Missouri and 56 miles east and west. Milk River meanders the entire width of the county, its entire valley acreage is under the St. Mary's Canal Project.

Surface and Soil: The surface is generally level, being broken in the northern part by the Cherry Ridges and in the southern part by the Bearpaw Mountains. A soil survey made by the Department of Agriculture states that in the northeastern part the wonderfully productive Turner loam predominates, while the soil of the rest of the "Big Flat" together with all the land south of the river to the mountains is Scobey loam, a very fertile soil that predominates in northeastern Montana. The soil of the northwestern portion is Phillips loam, while the mountain areas contain the fertile Blaine loam in the valleys, and native Mountain loam on the hills. The Milk River valley soil consists exclusively of Laurel sand loam with Clay loam interspersed in limited quantities. The Laurel loam under irrigation produces immense crops. Blaine county is fortunate indeed in the quality of its soil.

Crops: Large quantities of hay, alfalfa, blue joint and timothy are produced in the valleys and along the upland streams. Wheat and flax on the bench lands may reach a production of 2,000,000 bushels in 1928. Barley, oats, rye and corn are produced in abundance for forage and feed purposes. Sugar beets are produced in large quantities, grow to unusual tonnage and carry the highest sugar content of any others in the state. Out of six hundred acres of certified spuds grown in the state Blaine county produced 275 acres of a strain recognized by the south as of superior quality. No less than 70 carloads were shipped out last season (1927-1928).

In the Bearpaws the stock interests raise quality cattle and sheep that bring millions in receipts. The quality of the Bearpaw cattle is high, they frequently top the eastern markets. Hog production by the valley and bench farmers is another source of wealth. In the purebred swine business the county takes a leading part. Dairying is becoming a large industry here, while the quality of the turkeys has not been surpassed.

Drainage and Water Supply: Water for irrigation is supplied from the Milk River,

which is fed from St. Mary's Lake in the Rocky Mountains. Natural drainage systems exist, and with very little expense can be perfected.

Industries: The largest manufacturing industry of the county is the sugar beet factory at Chinook. This million dollar enterprise is revolutionizing agricultural practice in Milk River Valley, greatly increasing the income of the farmers. Fully 6,000 acres of beets in the county this year will supply the product for the factory's run.

A creamery at Chinook is taking all the cream produced by the dairymen, and a pasteurizing plant is supplying the people with pure milk.

Thirteen elevators located at Lohman, Chinook, Zurich, Harlem, Savoy and Coburg are ample to handle the grain produced, while a mill at Chinook and one at Harlem produce large amounts of choicest flour.

The Milk River coal mine is another large producing enterprise and many small mines add to the total output.

A gravel washing plant owned by the Great Northern supplies thousands of tons of clean gravel every year from an almost inexhaustible supply.

Mineral Resources: Extensive deposits of lignite coal of a superior quality are found in all parts of the county, and are being mined extensively and shipped out in all directions.

Oil and Gas: Oil is believed to exist in some rock strata and three gas wells each producing 10,000,000 cubic feet of gas daily are supplying fuel to Chinook and Havre.

Timber: Cottonwood trees grow in abundance in the valleys, while in the mountains fir and white pine are found in commercial quantities.

Land Values: Bench lands in the Turner and Scoby soil areas are selling readily at from $15 to $25 per acre, while those in the Phillips soil area are valued at from $5 to $10. Irrigated land, considering its quality and possibility, is the cheapest in the state and can be had from $40 to $90.

Transportation and Highways: The main line of the Great Northern runs through the Milk River Valley and a branch line now under construction from Saco in Phillips county to Hogeland will tap three townships in Blaine county and will serve approximately 16 townships. It is anticipated that the branch will be completed in time to haul the 1928 crop which, due to the presence of Turner loam, one of the richest wheat producing soils in the state, will yield a bumper crop.

A graveled highway paralleling the Great Northern intrigues the tourist and motorist and well graded dirt roads extend in all directions from the towns for the convenience of the farmers.

Education: Schools are distributed everywhere, and very few children need to go far to reach school. There are about 74 rural schools, and accredited high schools at Chinook, Harlem and Zurich. The attendance is about 1800 pupils.

Cities and Towns: Chinook, Harlem and Zurich are progressive incorporated towns with large up-to-the-minute business places, department stores, amusement centers. Lohman, Savoy, Turner and Coburg are the unincorporated towns. Strong, well conducted banks are found in Chinook, Harlem, Turner and Zurich. All of these institutions came through the readjustment period with unimpaired credit.

Climatological: The climate is the same as prevails throughout central and eastern Montana. The summers are warm with moisture usually distributed throughout the growing periods. The winters are moderate, livestock being able to range the year round. Rainfall 15 to 20 inches.

Blaine county has a county agent located at Chinook.

Crop Production: Blaine county placed first in the production of rye, valued at $235,936. The value of all crops was $3,343,851, divided as follows: Spring wheat 68,000 acres, acre yield 22, production 1,496,000 bushels, value $1,451,120; winter wheat 1,000 acres, acre yield 18, production 18,000 bushels, value $16,560; all wheat 69,000 acres, acre yield 21.9, production 1,514,000 bushels, value $1,467,680; oats 20,000 acres, acre yield 45, production 900,000 bushels, value $396,000; barley 2,200 acres, acre yield 38, production 83,600 bushels, value $50,160; rye 20,200 acres, acre yield 16, production 323,200 bushels, value $235,936; flaxseed 8,400 acres, acre yield 12.5, production 105,000 bushels, value $183,750; corn 6,000 acres, acre yield 25, production 150,000 bushels, value $108,000; potatoes 1,300 acres, acre yield 150, production 195,000 bushels, value $126,750; beans 400 acres, acre yield 20, production 8,000 bushels, value $24,000; alfalfa seed 200 acres, acre yield 2.0, production 400 bushels, value $5,200; all tame hay 25,000 acres, acre yield 2.1, production 52,500 tons, value $441,000; wild hay 21,700 acres, acre yield 1.0, production 21,700 tons, value $162,750; truck crops and vegetables $16,400; sugar beets 1,800 acres, acre yield 8.25, production 14,850 tons, value $126,225.

Livestock: Blaine county placed fifth in the value of livestock products marketed with a total of $1,976,100. Combined crops and livestock were valued at $5,319,951.

Value of Industries: The estimated value of manufacturing was $64,000, lumbering $5,580 (includes value of lumber cut only; value added by manufacturing not included), and tourist $130,000.

Total and Per Capita Production: The total production for the county was $5,519,531, and per capita production for 1927 was $793.

Assessment figures for 1927 show real estate and improvements assessed at $14,145,812, livestock at $2,515,008, public utilities at $3,366,940, and net proceeds of mines at $12,237. The total valuation was $21,504,674, with a taxable valuation of $6,819,207.

Tax levies run close to the state average. The levy for county purposes last year was 25 mills, and the average rate for school purposes was 23.52 mills on the taxable valuation. The average tax on farm and grazing lands was 10.4 cents an acre, on horses it was 49.8 cents a head, on cattle 58.1 cents a head, and on sheep 16.3 cents.

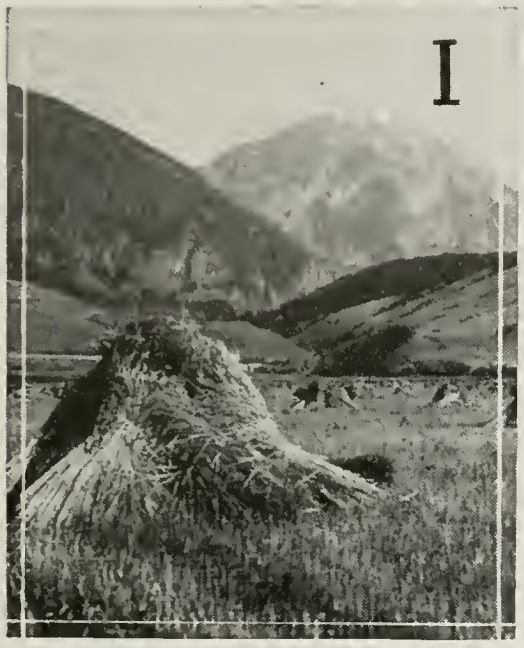
The net indebtedness of the county was reduced from $423,192.96 in 1924 to $374,272.38 in 1927. During the same period net indebtedness of school districts increased slightly, such debt amounting to $119,692.58 June 30, 1927. The per capita net debt for county and school purposes is $54.54, which is $3.64 less than it was in 1924.

Additional Information: For more detailed information about the resources of Blaine county write the Commercial Club, or the county agent, Chinook, Montana.

TETON COUNTY

Date of Creation	March 1, 1893	Est. County Population Jan. 1, 1928	5,978
Land Area	2,295 sq. miles	Population 1920	5,870
County Seat	Choteau	Population County Seat 1920	1,000
Altitude of County Seat	3,800 feet	Growing Season	109 days

By Robert Clarkson.



IN the north central part of Montana, Teton county is located on the eastern slope of the Rocky Mountains. Part of the county embraces a section of this continental range. The average altitude is approximately 3800 feet. Its climate is what might be termed moderate, with an occasional cold spell during the winter months. The annual snow fall is comparatively light and seldom sufficient for sleighing. The summers are warm with cool nights.

Surface and Soil: The county includes thousands of acres of rolling lowlands and bench prairie, hills and mountains, with soils that vary from a rich dark loam to the poorest gravelly formations common to some of its higher sections.

Crops: Soils of Teton county have been found to be admirably adapted to the growth of small grains, particularly wheat. In 1927 Teton county produced 3,205,000 bushels of wheat on 152,750 acres or an average yield of about 20 bushels per acre. Nourishing grasses well suited for the grazing of cattle and sheep are abundant where the land remains unbroken. These lands now provide grazing for 60,000 sheep and 17,000 head of cattle. The irrigated areas are extremely well adapted to the raising of alfalfa and sugar beets which have been found to thrive well in this territory. The production of high quality turkeys is an industry which has proved very successful. The feeding of cattle and sheep is another enterprise that could be profitably added to the irrigated sections.

Drainage and Water Supply: Teton county is well supplied with good mountain water, having Sun River for its boundary on the south, and being traversed by Deep Creek, Teton River, Blackfeet Creek, and Spring Creek. These streams are fed by the snow-capped Rockies, which bound the county on the west, and give an abundant supply of water for municipal and irrigation purposes. There are three irrigation projects in the county comprising 150,000 acres of irrigated land. They are the Greenfield Bench, Burton Bench and Bynum.

Land Values: Land values in Teton county range from $2.00 per acre to $150 or $200 per acre, depending upon location and quality. Good non-irrigated farms vary from $10 to $40 per acre, while in irrigated sections land values run from $40 to $200 per acre.

Transportation and Highways: Teton county is crossed by one main line and one branch line of the Great Northern railroad, and also has a branch line of the Chicago, Milwaukee, St. Paul & Pacific. These railroads give adequate transportation services to all sections of the county. Teton county also has a gravel highway running practically its entire width. The entire road from Great Falls to Choteau is gravelled and kept up in good shape. The county has also provided excellent roads in practically every section of the county.

Education: School facilities rank among the best in the state and at the present time there are 50 schools with an enrollment of 1,451 pupils with 83 teachers. There are three high schools in the county with an enrollment of 268 and 13 teachers.

Cities and Towns: Choteau, the county seat, is an old established town. Other good towns and market centers along the Great Northern are Bynum, Pendroy, Power, Dutton and Collins; Fairfield, Farmington and Agawam are on the Milwaukee.

Climatological: The average frost free period at the county seat in Teton county is 109 days. The average precipitation is 13.5 inches with 8.03 inches coming during April, May, June and July.

Crop Production: The value of all crops in Teton county totaled $4,507,405. This county won fourth place in production of spring wheat and fifth place in production of all wheat. The value of the various crops is as follows: Spring wheat 139,000 acres, acre yield 26, production 3,614,000 bushels, value $3,505,580; winter wheat 3,000 acres, acre yield 22, production 66,000 bushels, value $60,720; all wheat 142,000 acres, acre yield 25.9, production 3,680,000 bushels, value $3,566,300; oats 10,000 acres acre yield 45, production 450,000 bushels, value $198,000; barley 4,200 acres, acre yield 36, production 151,200 bushels, value $90,720; rye 2,500 acres, acre yield 20, production 50,000 bushels, value $36,500, flaxseed 300 acres, acre yield 9.5, production 2,800 bushels, value $4,900; corn 2,000 acres, acre yield 25, production 50,000 bushels, value $36,000; potatoes 500 acres, acre yield 130, production 65,000 bushels, value $42,250; alfalfa seed 25 acres, acre yield 3, production 75 bushels, value $975; all tame hay 16,000 acres, acre yield 1.6, production 22,400 tons, value $188,160; wild hay 36,500 acres, acre yield 1.25, production 45,600 tons, value $342,000; truck crops and vegetables, $1,600.

Livestock: The value of livestock products marketed in 1927 totaled $920,200. Combined crops and livestock are valued at $5,427,605.

Value of Industries: The estimated value of manufacturing is $262,000, lumbering $4,185 (includes value of lumber cut only; value added by manufacturing not included), and tourist $180,000.

Total and Per Capita Production: The total production for the county is valued at $5,873,790. Teton county is eighth in per capita production of $983.

Assessment figures for 1927 value all property in the county at $20,104,536. Real estate, with improvements, was valued at $14,185,900, livestock at $1,240,520 and public utilities at $2,775,054. Taxable value of all properties was $6,271,018.

The county tax rate of 19 mills on taxable valuations and average school rate of 23.89 mills are both below average for the entire state. Farm and grazing lands carried an average general tax for all purposes last year of 16.7 cents an acre, horses, 42.0 cents a head; cattle, 50.5 cents a head, and sheep, 15.4 cents.

The net indebtedness of the county June 30, 1924, was $513,320.65. June 30, 1927, it had dropped to $403,629.55, a 21 per cent reduction. During the same period, net indebtedness of school districts decreased from $139,459.31 to $124,828.28, about 10½ per cent. The per capita net debt for county and school purposes was $90.02, June 30, 1927.

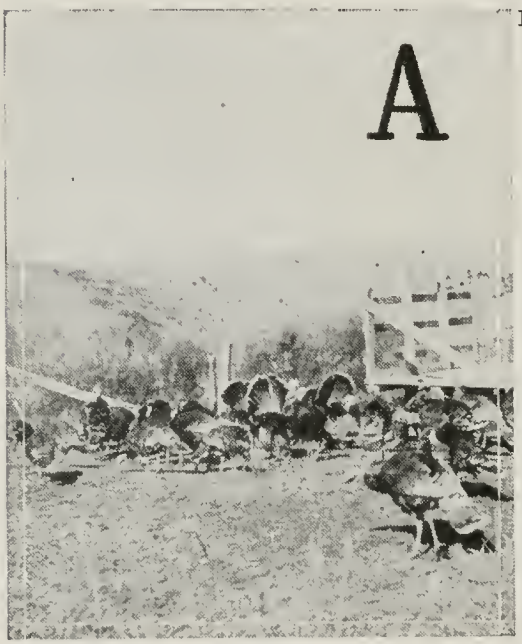
The county agent is located at Choteau, Montana.

Additional Information: For more detailed information about the resources of Teton county, write the Lions Club, or the President of the Teton County Farm Bureau, at Choteau, Montana.

PONDERA COUNTY

Date of Creation	April 1, 1919	Est. County Population Jan. 1, 1928	6,108
Land Area	1,634 square miles	Population 1920	5,741
County Seat	Conrad	Population County Seat 1920	988
Altitude County Seat	3,500 feet	Growing Season	122 days

By W. F. Palin.



ALTITUDE, soil and topography all combine to produce an unusual variety of agricultural crops in Pondera county, which since its creation in 1919 has progressed steadily until it now ranks with the oldest and most prosperous counties.

The Continental Divide of the Rocky Mountains forms the western boundary; this third of the county is devoted to stock raising. The central third centers around Valier, irrigated under the Carey Land Act, while the eastern third is devoted to non-irrigated farms.

Surface and Soil: The general surface of the agricultural portion of the county is composed of glacial drift ranging to 200 feet in depth, which gives a fairly uniform farming soil, ranging from chocolate brown clay loam to a sandy loam of rich and easy working qualities. The foot hills are admirably adapted to stock raising.

Crops: The principal grain crops grown on both the irrigated and non-irrigated lands are wheat, oats, barley, and flax. Corn is a profitable crop, and the acreage is being increased. Seed peas, beans and sugar beets are special crops which give promise of becoming important producers. Alfalfa is the principal hay crop grown on irrigated lands.

Drainage and Water Supply: The Carey project at Valier has been constructed to serve 80,000 acres of land and water is available for this amount. The Blackfeet Indian irrigation project also extends into the northwest part of the county. Several good creeks flow from the mountains in an easterly and northerly direction, eventually emptying into the Marias River.

Industries: .There are three modern creameries operating, one each in Conrad, Williams and Valier. The dairy industry has increased greatly and much interest is shown in feeding the products of the soil through the medium of livestock on irrigated land. Dry land farming is on the increase. The growing of turkeys and other poultry has become an unusually well developed industry in this county. Diversified farming and stock raising continue to be the leading industries.

Mineral Resources: Coal is mined for local consumption and oil and gas have been discovered about ten miles southwest of Conrad. Much activity has taken place in drilling for oil and plans are being made for the rapid development of the oil and gas industry.

Timber: There is a small amount of lodge-pole pine timber in the mountainous portions of the county.

Land Values: Irrigated lands sell at $50 to $100 an acre and the non-irrigated improved lands up to $50; non-irrigated unimproved lands from $10 an acre and up.

Transportation and Highways: The Great Northern and the Montana Western Railways provide adequate rail facilities. The Yellowstone-Glacier Highway is now in the process of being graded and graveled throughout its entire length across the county. Custer Battlefield Hiway and the Sunshine Trail both pass through the county and good dirt roads connect these highways with all parts of the county.

Education: There are 47 schools in the county, including three high schools. The total enrollment is 1,372.

Cities and Towns: Conrad, the county seat, is the largest town in the county. Valier is a progressive town in the center of the irrigated area. Other towns are Dupuyer, the oldest town in the county, Brady, Williams, Manson, Ledger, and Fowler.

Climatological: Pondera has five seeding and growing months. The winters are mild and the summers not too warm for good growing conditions.

Crop Production: The value of all crops in Pondera county in 1927 totaled $3,630,975, divided as follows: Spring wheat 121.000 acres, acre yield 24, production 2,904,000 bushels, value $2,816,880; winter wheat 1,000 acres, acre yield 25, production 25,000 bushels, value $23,000; all wheat 122.000 acres, acre yield 24, production 2,929,000 bushels, value $2,839,880; oats 9,000 acres, acre yield 46, production 414,000 bushels, value $182,160; barley 7,000 acres, acre yield 39, production 273,000 bushels, value $163,800; rye 300 acres, acre yield 25, production 7,500 bushels, value $5,475; flaxseed 1,400 acres, acre yield 10.5, production 14,700 bushels, value $25,725; corn 3,000 acres, acre yield 21, production 63,000 bushels, value $45,360; potatoes 800 acres, acre yield 140, production 112,000 bushels, value $72,800; all tame hay 15,000 acres, acre yield 1.6, production 24,000 tons, value $201,600; wild hay, 9,400 acres, acre yield 1.0, production 9,400 tons, value $70,500; truck crops and vegetables, value $20,700, and sugar beets 50 acres, acre yield 7, production 350 tons, value $2,975.

Livestock: Livestock products marketed in 1927 totaled $803,500. Combined crops and livestock were $4,434,475.

Value of Industries: The estimated value of manufacturing in 1927 was $34,000 and tourist $150,000.

Total and Per Capita Production: The total production for the county is valued at $4,618,475 and the per capita production for 1927 at $756.

Pondera county has a county extension agent located at Conrad.

The total assessed value of all property in the county in 1927 was $17,362,504, with real estate and improvements assessed at $12,562,000, livestock at $970,000 and public utilities at $1,755,000. The total taxable value of all property was $5,338,902.

The tax rate for county purposes last year was 27 mills on the taxable valuation, and the average levy for school purposes was 25.58 mills. Taxes for all general purposes averaged 22.57 cents an acre on farm and grazing lands, 50.6 cents a head on horses, 59.7 cents a head on cattle, and 16.3 cents a head on sheep.

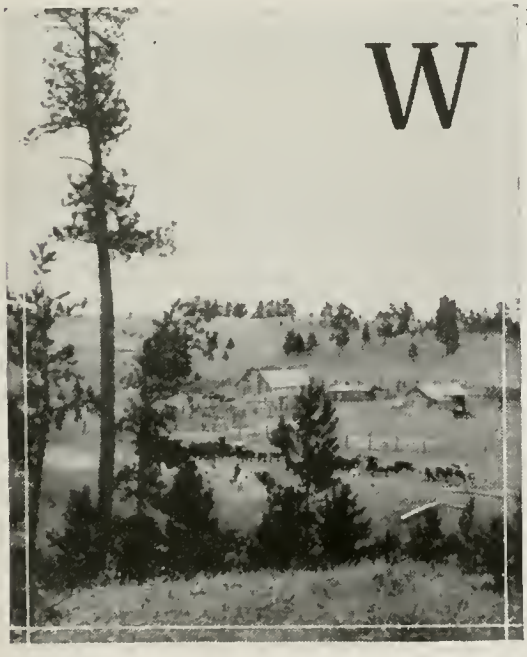
Pondera's net debt June 30, 1924, amounted to $528,669.31. June 30, 1927, it was $475,021.50, a reduction of about 10 per cent. During the same three-year period, the total net debt of school districts decreased from $153,378.52 to $137.782.14, making the per capita net debt for county and school purposes $106.74 June 30, 1927.

Additional Information: For more detailed information about the resources of Pondera county, write to the Commercial Club, Valier, or the Community Club, Conrad, Montana.

LIBERTY COUNTY

Date of Creation	Feb. 5, 1921	Est. County Population Jan. 1, 1928	1,571
Land Area	1,440 square miles	Population of County 1920	2,416
County Seat	Chester	Population of County Seat	815
Altitude County Seat	3,139 feet	Growing Season	180 days

By W. H. Trumbull.



WHILE Liberty county is one of the smallest counties in the state, containing 1,440 square miles, it is none the less important. It was formed from Hill, Toole and Chouteau counties and lies in north central Montana, reaching to the international boundary line. In form it is oblong, 60 miles north and south by 24 miles east and west.

Surface and Soil: The soil consists of a volcanic ash deposit, which by action of the elements and time has formed into alluvial and upland loam facings, with a deep, rich subsoil of life-giving adobe.

Crops: While the county is adapted to all grain crops, wheat is the principal one. Dwarf varieties of corn are preferred on account of their excellent yielding tendency in this altitude. Vegetables are grown in abundance without irrigation. Potatoes of excellent quality are easily produced. The native grasses are the western bluepoint and buffalo grass.

Drainage and Water Supply: In addition to the moisture furnished by the Marias River which flows easterly through the southern part of the county, water supply is found in the Cottonwood Creek and in reservoirs built of subsoil.

Industries: Agriculture and livestock are the chief occupations. Coal is also mined.

Mineral Resources: Oil and gas prospecting is under way in several places in the western and northern portion of the county, and coal of good quality is produced for local consumption in the northern part.

Timber: The timber abounds only along streams or in valleys, but is not of a merchantable character. Trees and shrubbery of adapted kinds are grown plentifully by exercising a slight amount of early care.

Land Values: Much naked land is to be had at $12.00 per acre. An upward scale from this figure presupposes an amount of broken soil, other improvements, oil, gas and mineral rights, etc. Under present prices, $15.00 will buy most desirable farm lands on very reasonable terms.

Transportation and Highways: The main line of the Great Northern crosses the county east and west and is paralleled by the Roosevelt (coast to coast) Highway.

Education: There are 31 schools, high schools being located at Chester, Lothair and Joplin. The total enrollment is 621. All laudable school activities are generously supported.

Cities and Towns: Chester, the county seat, is the largest community and the principal trading point. Lothair, Tiber and Joplin are other railroad towns, all containing grain elevators.

Climatological: Climate is tempered by surrounding mountains, and is ordinarily moderate and mild. Predominating rainfall is during the months of April, May and June. Cool nights in summer lend great virility to crop growing conditions.

Crop Production: Total crops produced in 1927 were valued at $1,139,735, divided as follows: Spring wheat 56,000 acres, acre yield 16, production 896,000 bushels, value $869,-120; oats 3,000 acres, acre yield 45, production 135,000 bushels, value $59,400; barley 1,000 acres, acre yield 40, production 40,000 bushels, value $24,000; rye 200 acres, acre yield 20, production 4,000 bushels, value $2,920; flaxseed 1,400 acres, acre yield 8.5, production 11,900 bushels, value $20,825; corn 1,000 acres, acre yield 20, production 20,000 bushels, value $14,000; potatoes 300 acres, acre yield 130, production 39,000 bushels, value $25,350; all tame hay 6,000 acres, acre yield 1.8, production 10,800 tons, value $90,720; wild hay 4,000 acres, acre yield 1.1, production 4,400 tons, value $33,000.

Livestock: The value of livestock products marketed in 1927 totaled $483,200. Combined crops and livestock were $1,622,935.

Value of Industries: The estimated value of manufacturing in 1927 was $11,000, and tourist $100,000.

Total and Per Capita Production: The total production for the county is valued at $1,733,935. In per capita production the county tied for fifth place with Meagher with a total of $1,104.

In 1927, real estate and improvements were assessed at $5,891,616, livestock at $402,040 and public utilities at $1,450,179. The total value of all property was $8,025,486, with a taxable valuation of $2,553,813.

The tax rate for county purposes last year was 35.5 mills on the dollar of taxable valuation, and the average school levy was 23.9 mills. Farm and grazing lands carried a tax of 14.2 cents an acre, horses 53.1 cents a head, cattle 61.9 cents a head and sheep 18.5 cents.

The net debt of the county June 30, 1924, amounted to $171,126.38. June 30, 1927, it was $121,334.59, a reduction of approximately 29 per cent. During the same three-year period, the net indebtedness of school districts decreased from $77,231.97 to $59,818.44, about 22 per cent. The per capita net debt for county and school purposes was $74.98 June 30, 1927.

Additional Information: For more detailed information about the resources of Liberty county, write to the state publicity division, Helena, Montana.

CHOUTEAU COUNTY

Date of Creation.....February 2, 1865	Altitute Prairie.....2,900 to 3,200 feet
Land Area.....3,942 sq. miles	Est. County Population Jan. 1, 1928....7,348
County Seat.....Fort Benton	Population County Seat 1,064
Altitude County Seat.....2,600 feet	Growing Season.....May 10 to Sept. 20

By G. C. Schmidt.

ORGANIZED in the year 1865, Chouteau originally contained almost 30,000 square miles. It was named after an intrepid Frenchman by the name of Pierre Chouteau, who was for many years President of the American Fur Company with headquarters at Fort Benton. The county as a whole is a rolling plain traversed by a mighty river and bordered on the south by the pine clad Highwood Mountains and on the northeast by the Bear Paw Mountains. It is a hunters' and fishers' paradise. On the prairies may be found prairie chicken, sage hen, and the imported Hungarian partridge. In the mountains and brush land are also found the native pheasant, blue grouse, and the imported Chinese pheasant. Swarms of wild duck and geese are at times found on the prairie lakes and on the Missouri River. For many years the mountain streams have been stocked with trout fry so the ardent angler is always well repaid for his efforts. The Missouri is the habitat of pike, carp, buffalo fish, catfish, ling, and other desirable food fish.

Surface and Soil: The surface of Chouteau county is a gently rolling plain, divided into benches by the Missouri, Marias and Teton Rivers and smaller streams. The prairie is overlaid with 12 to 24 inches of chocolate clay loam soil with clay sub-soil.

Crops: No. 1 dark hard winter and spring wheats are the principal crops. But in addition to this fancy wheat, the prairies of Chouteau county also successfully produce oats, flax, corn, and all root crops. Alfalfa on the irrigated bottoms and blue joint and timothy in the mountain valleys are the principal hay crops supplemented by grain crops that are cut for hay. With its 120 to 130 days of growing season, corn is rapidly becoming a popular and profitable crop. Sugar beets are successfully produced on the irrigated river and creek bottoms.

Drainage and Water Supply: The surface of Chouteau county is well drained by the Missouri, Teton and Marias Rivers and by the numerous smaller tributaries of the Missouri—Highwood, Shonkin, Arrow, Big Sandy, Little Sandy, Eagle and Birch Creeks. These numerous streams originating in the mountains furnish every part of the county with a good supply of wonderful water. Parts of the Chouteau county prairie are becoming dotted with the wind mills of farmers who have successfully found underground water supplies.

Industries: The principal industry of Chouteau county is small grain farming, closely followed by the sheep and cattle industries. Many farmers successfully supplement their grain farming operations with dairying and raising of turkeys.

Mineral Resources: Large deposits of a good grade of lignite coal are found in the eastern and northern parts of the county. Crude oil has been found in counties adjacent to Chouteau county and this county has numerous promising structures which will be tested out by the drill point during the next few years.

Timber: A limited amount of timber, suitable for posts and firewood, may be found along the river and creek bottoms and in the mountainous area of the southern and northeastern parts of the county.

Land Values: Good level and gently rolling prairie farms can be purchased at from $12.50 to $20 per acre, which includes in most cases fencing, some cultivation and small buildings. Farm lands in more desirable sections and reasonably close to market, improved and unimproved, may be had from $20 to $35 per acre. It has been demonstrated more than once that one good crop will pay the entire cost of a farm.

Transportation and Highways: The head of navigation on the mighty Missouri River is at Fort Benton in Chouteau county, but river transportation has been very light since the advent of the railroad. Chouteau is traversed by the Great Northern and Milwaukee systems, so that the county is well supplied with rail and water transportation to the outside world. The public highway system is gradually being extended to all parts of the county with well graded dirt roads.

Education: The county is well supplied with good rural schools with modern high schools at Fort Benton, Geraldine, and Big Sandy.. There is a public library at Fort Benton with branches throughout the county.

Cities and Towns: The cities and towns of the county are in comparative order of importance: Fort Benton, Big Sandy, Geraldine, Highwood, Square Butte, Carter, Loma, and Montague.

Climatological: Chouteau county is in the Chinook wind belt. The average winter temperature compares with central Iowa. Over one-half of its annual rainfall comes during the growing months of May to August.

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Crop Production: Chouteau ranked first in wheat production, this crop alone bringing to the county $5,270,500. Total production is valued at $6,265,982, divided as follows: Spring wheat 150,000 acres, acre yield 25, production 3,750,000 bushels, value $3,637,500; winter wheat 71,000 acres, acre yield 25, production 1,775,000 bushels, value $1,633,000; all wheat 221,000 acres, acre yield 25, production 5,525,000 bushels, value $5,270,500; oats 12,000 acres, acre yield 38, production 456,000 bushels, value $200,640; barley 2,200 acres, acre yield 25, production 55,000 bushels, value $33,000; rye 6,500 acres, acre yield 15, production 97,500 bushels, value $71,175; flaxseed 400 acres, acre yield 9, production 3,600 bushels, value $6,300; corn 13,000 acres, acre yield 18, production 234,000 bushels, value $168,480; potatoes 500 acres, acre yield 120, production 60,000 bushels, value $39,000; all tame hay 20,000 acres, acre yield 2.3, production 46,000 tons, value $386,400; wild hay 9,100 acres, acre yield 1.2, production 10,900 tons, value $81,750; truck crops and vegetables $3,000; and sugar beets, 75 acres, acre yield 9, production 675 tons, value $5,737.

Livestock: Livestock products marketed in 1927 totaled $1,585,000. Combined crops and livestock were $7,850,982.

Value of Industries: The estimated value of industries of the county is as follows: Manufacturing $63,000, and tourist $120,000.

Total and Per Capita Production: The total production for the county is valued at $8,033,982 and per capita production for 1927 at $1,093.

Chouteau county has a county agent located at Fort Benton.

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Assessment figures for 1927 show that Chouteau's real estate and improvements had a value of $20,230,000. Livestock was assessed at $1,770,000 and public utilities at $5,375,000. The total assessed value of all property was $29,271,333 and the taxable value was $9,274,104.

In taxes property owners are favored somewhat, the county levy of 21.16 mills and the school levy of 20.9 mills, both on taxable value, being slightly lower than averages for the state. The average tax on farm and grazing land last year was 11.6 cents an acre, on horses it was 51.3 cents a head, on cattle 49.4 cents a head, and on sheep 15.0 cents.

The net county debt June 30, 1924, was $985,953.26. June 30, 1927, it had been reduced to $803.976.86, something like 18 per cent. During the same period, the net indebtedness of district schools was reduced from $296,302.92 to $214,836.04, or 27½ per cent. The per capita debt for county and school purposes was $92.19 June 30, 1927.

Additional Information: For more detailed information about the resources of Chouteau county, write to the Chouteau County Development Association and the Fort Benton Commercial Club, Fort Benton, Montana.

HILL COUNTY

Date of Creation	Feb. 28, 1912	Est. County Population Jan. 1, 1928	12,677
Land Area	2,907 square miles	Population 1920	13,958
County Seat	Havre	Population County Seat	5,429
Altitude County Seat	2,505 feet	Growing Season	130 days

By W. F. Casey.

ONE of the foremost counties of the state to show astonishing yields and unexcelled quality in wheat and other small grains is Hill. Previous to 1910 the area comprising Hill county was occupied almost exclusively by ranchers engaged in the business of raising range cattle, sheep and horses. The influx of settlers since that time has transformed the large ranch ranges into a comparatively well settled farming region, the principal crop being spring and winter wheat.

Diversification: After several years of farming of an experimental nature, a more diversified system now prevails and in addition to its wheat of high protein content and large yield per acre, Hill county is enjoying other sources of income such as that derived from dairying, hog raising, corn, cattle, and poultry.

Surface and Soil: Generally rolling with exception of areas in the vicinity of the Bear Paw Mountains in the eastern end of the county and the territory adjacent to the Sweet Grass Mountains in the northwest corner. Soil has a loam composition and a deep rich sub-soil adapted to non-irrigated farming with an average rainfall.

Drainage and Water Supply: Water for irrigation is available from the Milk River which enters from the northwest corner and traverses the entire length of the county. No project has been created in this portion of the county as yet but the United States Government has reserved the Chain of Lakes region, adjacent to the Milk River and north of the town of Kremlin, as a reservoir for storing the waters of the Milk River in flood season. A project in the southwestern corner including an area of 200,000 acres has been under way for some time and will eventually furnish water in growing season sufficient to make certain an increased production of small grains.

Industries: General farming, stock raising, dairying, creameries, flour mills.

Mineral Resources: Coal, natural gas, brick and tile clay, and building stone. Gas has been discovered in quantities abundant to supply the city of Havre for lighting and heating purposes and development of a larger supply will follow as soon as the necessity arises for supplying manufacturing power. Early in 1928, while drilling for oil at Kremlin, 20 miles west of Havre, a heavy flow of natural gas was encountered.

Land Values: Benchlands from $5 to $20 per acre; valley lands from $20 to $75.

Transportation and Highways: The main line of the Great Northern runs through the county about midway between its north and south boundary. The Havre-Butte Division of the Great Northern runs in a southwesterly direction from Havre to Great Falls, Helena, and Butte. Highways have been improved and at present the projects completed furnish a hard surface road from the eastern line of the county to Havre, Kremlin, Gildford, and Hingham. The grade has been partly completed to extend the hard surface through the county to the towns of Rudyard and Inverness.

Education: Each of the towns named above have accredited high schools and standard grade schools. Rural schools are maintained in the outlying vicinities and are of high standard. Havre, the county seat, maintains an excellent high school in keeping with the population and requirements of the city.

Climatological: Minimum temperatures are recorded in some years but little concern is shown by inhabitants due to dry mountain air and short duration of winter storms. The climate is well adapted to the industries; warm summers with long growing season and winters sufficiently mild to permit grazing of range cattle throughout the entire year.

Scenic Interest: The Bear Paw Mountains are of scenic as well as historic interest. A portion of the mountainous region adjacent to Beaver Creek has been established as a National Park and is fast becoming a summer playground. Fort Assiniboine located near in the foothills has in recent years been sold to the State of Montana and is now occupied by the Extension Department of the Montana State College as an experiment station.

Crop Production: Hill county placed first in 1927 in the value of spring wheat, third in the value of all wheat, and fifth in the value of all crops. Total value was $5,310,505, divided as follows: Spring wheat 194,000 acres, acre yield 23, production 4,462,000 bushels, value $4,328,140; winter wheat 3,000 acres, acre yield 24, production 72,000 bushels, value $66,240; all wheat 197,000 acres, acre yield 23, production 4,534,000 bushels, value $4,394,380; oats 17,000 acres, acre yield 42, production 646,000 bushels, value $284,240; barley 6,000 acres, acre yield 33, production 198,000 bushels, value $118,000; rye 5,000 acres, acre yield

13.3, production 66,500 bushels, value $48,545; flaxseed 2,800 acres, acre yield 10.8, production 30,200 bushels, value $52,850; corn 5,000 acres, acre yield 18, production 90,000 bushels, value $64,800; potatoes 800 acres, acre yield 130, production 104,000 bushels, value $67,600; beans 300 acres, acre yield 18, production 5,400 bushels, value $16,200; all tame hay 12,000 acres, acre yield 2.3, production 27,600 tons, value $231,840; wild hay 2,700 acres, acre yield 1.37, production 3,700 tons, value $27,750; truck crops and vegetables $3,500.

Livestock: The total value of livestock products marketed in 1927 was $1,049,500. Combined crops and livestock were valued at $6,360,005, giving Hill county eighth place.

Value of Industries: The estimated value of manufacturing was $1,010,000; coal mining $29,812 and tourist $235,000.

Total and Per Capita Production: The total production for the county was $7,634,817 and per capita production for 1927 was $602.

The county agent is located at Havre.

Hill county's real estate, with improvements, was assessed in 1927 at $20,881,969, livestock at $807,000 and public utilities at $4,701,000. The total assessed value of all property was $29,207,314. The taxable value was $9,107,315.

Taxes are lower than the average for the state. The rate for county purposes last year was only 17 mills on taxable valuations, and the levy for school purposes, 27.69 mills. The average amount of tax on an acre of farm and grazing land was 13.4 cents, on horses 45.2 cents a head, cattle, 50.5 cents a head, and on sheep, 14.8 cents.

The net indebtedness of the county decreased from $680,917.32 June 30, 1924, to $467,049.34 June 30, 1927, a reduction of $213,921.82, or 31.4 per cent. During the same period, the tax levy for county purposes dropped from 23 mills to 17 mills.

The net indebtedness of school districts increased slightly during this time, such indebtedness totaling $409,478 07 in 1927, as compared with $339,628.18 in 1924. The per capita net debt for county and school purposes decreased from $73.12 in 1924 to $62.80 in 1927.

Additional Information: For more detailed information about the resources of Hill county, write to the Farmers and Merchants Club at Kremlin, or the Chamber of Commerce, Havre, Montana.

GRAIN IN SHOCKS

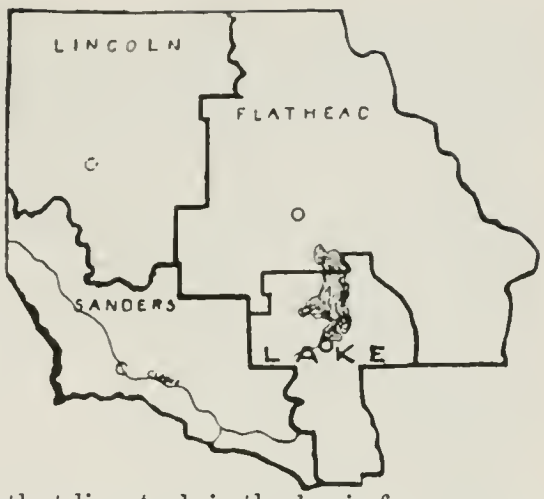
NORTH WESTERN MONTANA

Produces More Than Half the Lumber Cut of the State—In Undeveloped Water Power Ranks First—Region Ideally Adapted to Dairying and Diversified Farming.

Lying on the Pacific slope side of the Rocky Mountains, and enjoying a climate that is tempered by its location, the North Western district is a region of possibilities in tourist attractions, diversified farming and electrical energy. In it are included Flathead, Lincoln, Lake and Sanders counties, and also the western half of the Glacier National Park. Though mountainous, many broad and fertile valleys are found, and in Lincoln county is found the lowest elevation above sea level in the state.

Lumbering is the principal industry, more than half the annual cut of the state being produced here. Considerable fruit is raised. Diversified farming is advancing with dairying as one of the major activities. Both non-irrigated and irrigated farming are followed. The largest body of irrigated land is in Flathead and Lake counties. In every county, however, irrigated lands are awaiting development. In Flathead, Lincoln and Sanders counties there are also large tracts of cut-over lands, which, when cleared, are adapted to agricultural purposes.

The counties in this district contain two and six-tenths per cent of all land in farms in the state and produce three per cent of all crops raised. Thirty-two per cent of the apples are raised here, 15 per cent of the potatoes, nine of seed peas, seven of barley, six of all tame hay, five of winter wheat, five of alfalfa hay, five of alfalfa seed, three of all wheat, three of oats, one of corn, one of rye, and one per cent of the wild hay.



The irrigated lands of this district will produce a wide range of crops making possible a high degree of diversification and intensified production. The climate is favorable for dairy farming. High quality feeds are produced at low cost. With dairying as a nucleus many farmers are branching out into hog production, poultry raising, orcharding and other enterprises. The commercial production of vegetables, small fruits and canning crops offers possibilities, returns to the farmer depending on available markets. The district is the most important producer of commercial potatoes in the state. Flathead county led the state in the value of potatoes marketed in 1927.

The Montana Experiment Service advises that livestock is the basis for successful farming in the district, feed crop production being the fundamental factor in the cropping system and alfalfa the fundamental forage crop. Wheat is an important cash crop when combined with stock and feed production. Head lettuce, celery, French endive and asparagus are among the vegetables that offer possibilities for commercial production and export, say officials of the Experiment Service.

The heaviest forest stands in the state are in northwestern Montana. The combined timber resources of the counties comprising this district offer twenty-four thousand, three hundred and ninety-one million board feet of merchantable timber. Flathead county stands first in the state in timber resources, Lake, third, Lincoln fourth, and Sanders ninth. There are 44 active saw mills in the district.

Some mining is done in the western part, and large deposits of good coal are reported in Flathead county, but the principal industrial resource is water power. In developed water power the district ranks second, but in undeveloped, first.

Many of Montana's most attractive vacation resorts are located in this region. Along the shores of Flathead Lake picturesque beaches and valley sites are converted into summer homes. Good roads make game country accessible.

LAKE COUNTY

Date of Creation.....Aug. 10, 1923
Land Area.....1,654 square miles
County Seat.....Polson
Est. County Population Jan. 1, 1928.....9,810
Population of County Seat.....1,500
Altitude of County Seat.....2,908 feet
Growing Season.....April 1 to Oct. 15

By M. M. Marcy.

IN potential hydroelectric power, Lake county has unlimited possibilities. Irrigated farms and considerable timber also add to the county's assets. The Flathead is the principal valley. It is a beautiful mountain valley of equable climate and exceptional fertility. It lies between the majestic Mission Range on the east with very little foothills area, and the Little Bitter Root Mountains on the west; is traversed generously by mountain streams which empty into the Flathead River, the outlet of Flathead Lake, which lies in the northern portion of Lake county. Flathead Lake is one of the largest inland lakes in the United States, outside of those embraced in the Great Lakes system. It is about thirty miles in length and from five to ten miles in width, with a rugged, wooded shore line of several hundred miles, pleasant and picturesque beaches, and dotted with villa sites reserved by the United States government for sale as summer homes. Lake county embraces the greater portion of the widely known Flathead Indian Reservation.

Surface and Soil: The surface is gently rolling near the mountains, terminating in wide flats adequately drained, in the center of the valley. The soils vary; in parts rich loam, some sandy loams, but for the greater part clayey loam of high fertility.

Drainage and Water Supply: In this valley lies the Flathead Reservation Irrigation Project embracing 120,000 acres of irrigated lands. This project has been constructed by the Federal Government, is nearly completed and the cost of water right is estimated at $40 per acre in the Jocko division, and $65 per acre on the remainder of the project, payable in 56 annual installments without interest.

Crops: Alfalfa, grains, clover, grasses and vegetables. Corn is matured and dairying is becoming an important industry. There is considerable sheep raising throughout the valley. Vegetables are grown in abundant yields. Potatoes raised in this valley and other crops are sought in many markets for seed purposes.

Industries: A saw mill at Polson with a daily output of 100,000 feet, several small mills; flour mills at Polson and Ronan; creamery at Polson and a cheese factory at Pablo. Extensive logging of tribal timber is conducted near Ronan and Arlee. Railroad operations.

Water Power: The Montana Power Company has leased the water power site on Flathead River near Polson from the United States Government and have started preliminary work on this project. The complete development of this site will produce from 200,000 to 250,000 horse power.

Timber: One of the largest bodies of pulp timber in America is available to Flathead Lake and there are several billion feet of tribal and privately owned merchantable timber standing in Lake county.

Mineral Resources: Extensive oil leases outstanding; development up to present includes spudding in of well in December, 1927.

Land Values: Irrigated lands range in price from $35 to $75 an acre; non-irrigated tillable lands from $20 to $25; grazing lands $5 to $10 an acre.

Cities and Towns: Polson, a city of 1,500 people at the foot of Flathead Lake, is the county seat and the terminal of the Flathead branch of the Northern Pacific Railway, running north from the main line at Dixon. Ronan is located in the center of the county, an important trading point in a prosperous farming community, population about 900. St. Ignatius, with a population of about 700, is in the heart of a fertile farming section, the first settlement on the Flathead Reservation and the home of the Mission Fathers. Other towns conveniently spaced for trading are Rollins, Dayton, Big Arm, situated on the west shore of Flathead Lake; Pablo and Charlo are thriving towns in the center of irrigated lands; D'Aste, Ravalli and Arlee are also trading centers.

Transportation and Highways: The Flathead branch of the Northern Pacific, passenger busses daily through the Reservation, Missoula to Kalispell and return. Boat service on Flathead Lake, Polson to Somers. The Park-to-Park National Highway runs through the center of the county from Arlee on the south to Rollins on the north, touching nearly every town of importance in the county. All other highways in excellent condition.

Education: There are 41 schools, including high schools at Ronan, St. Ignatius, Arlee, Polson and Charlo. The total attendance is 2,011.

Scenic Advantages: The scenic advantages of Lake county are not excelled by those of any other county in Montana and the opportunities for the development of tourist resorts and hotels are unlimited.

Climatological: According to the weather bureau station at Polson, the average temperature is 45.2 degrees and the average annual precipitation is 15.55 inches. Observations of 15 years record an annual frost-free period of 138 days.

Crop Production: The total value of all crops was $1,856,518, divided as follows: Spring wheat 19,000 acres, acre yield 19, production 361,000 bushels, value $350,170; winter wheat 27,000 acres, acre yield 24, production 648,000 bushels, value $596,160; all wheat 46,000 acres, acre yield 21.9, production 1,009,000 bushels, value $946,330; oats 7,000 acres, acre yield 45, production 315,000 bushels, value $138,600; barley 3,200 acres, acre yield 35, production 112,000 bushels, value $67,200; rye 1,100 acres, acre yield 16, production 17,600 bushels, value $12,848; flaxseed 300 acres, acre yield 10, production 3,000 bushels, value $5,250; corn 1,000 acres, acre yield 30, production 30,000 bushels, value $21,600; potatoes 700 acres. acre yield 150, production 105,000 bushels, value $68,250; beans 200 acres, acre yield 18, production 3,600 bushels, value $10,800; seed peas 1,000 acres, acre yield 21, production 21,000 bushels, value $44,100; alfalfa seed 25 acres, acre yield 2.0, production 50 bushels, value $650; all tame hay 25,000 acres, acre yield 2.3, production 57,500 tons, value $483,000; wild hay 2,700 acres, acre yield 1.35, production 3,600 tons, value $27,000; apples 18,300 bushels, value $23,790; truck crops and vegetables, $6,000; miscellaneous fruits, $1,100.

Livestock: The total value of livestock products marketed in 1927 was $786,300. Combined crops and livestock totaled $2,642,818.

Value of Industries: The estimated value of manufacturing was $625,000, lumbering was $114,390 (includes value of lumber cut only. Value added by manufacturing not included), and tourist $234,000.

Total and Per Capita Production: The total production for the county was $3,616,208 and per capita production for 1927 was $369.

The value of all property in the county, according to 1927 assessment returns, is $11,789,592. Real estate and improvements were valued at $7,957,392, livestock at $677,940 and public utilities at $1,576,485. The total taxable value of all property was $3,657,333.

For county purposes, the tax rate last year was 28.75 mills on the dollar of taxable valuation; for school purposes, the levy averaged 34.67 mills. The tax for all general purposes was 30.4 cents an acre on farm and grazing land, 63.5 cents a head on horses, 82 cents a head on cattle and 19.1 cents a head on sheep.

The county's net debt June 30, 1927, was $224,590.19, and the net debt of school districts amounted to $255,056.37. The per capita net debt for county and school purposes was approximately $45 June 30, 1927.

The county agent is located at Ronan.

Additional Information: For more detailed information about the resources of Lake county, write to the secretary of the Commercial Club at Polson, Montana.

LINCOLN COUNTY

Date of Creation	July 1, 1909	Est. County Population Jan. 1, 1928	8,236
Land Area	3,666 square miles	Population County, 1920	7,797
County Seat	Libby	Population County Seat, 1920	1,522
Altitude County Seat	2,053 feet	Growing Season	97 days

By L. T. Winslow.

NESTLED among the mountains in the extreme northwestern corner of the state, Lincoln county has the distinction of having the lowest elevation above sea level—1,800 feet—of any portion of Montana. This low altitude is found along the Kootenai River, according to the United States Geological Survey.

Lumbering and mining are the chief industries, although agriculture, and more especially dairying, are rapidly coming to the fore. The agricultural areas are limited, the only considerable body of open land being found in the Tobacco Plains valley, near Eureka. The Kootenai valley is long and narrow and there are numerous benches lying between the river and the mountains, which must be cleared for farming operations.

Soil: In the Tobacco Plains Valley soil types range from sandy loam to glacial loam and clay, and on the bench lands are chiefly glacial loam. In other districts a black loam is found in the valleys, a light red volcanic ash, frequently underlain with gravel on the benches, while in places a gray loam occurs in both the valleys and on the benches.

Crops: Timothy, clover and alfalfa prove to be good crops, and splendid summer grazing is found on the national forests, which occupy two-thirds of the county. Small fruits, vegetables and root crops grow especially well. The sandy loam soil and climatic conditions make ideal conditions for the growing of high-class commercial potatoes. Dairying is taking a prominent place in the county agriculture.

Drainage and Water Supply: Lincoln is probably the best watered county in the state. The Kootenai River, which at times carries a larger volume of water than the Missouri, flows southerly more than half the length of the county, and then swings westward, covering 100 miles in all through the county. It is asserted there is a running stream in almost every gulch and more than 100 lakes, many of unusual beauty. Besides the Kootenai, the principal streams are the Tobacco River in the northeastern and the Yaak River in the western part. The undeveloped water power of the county is estimated at 31,000 horsepower, exclusive of the many small developments.

Mineral Resources: The county has produced commercially, gold, silver, copper, lead and zinc. The United States Geological Survey, bulletin 384, pronounces the Lincoln county district, "a promising field for the prospector."

Timber: The Kootenai forest of 1,617,140 acres lies wholly within the county, and in addition there are 398,666 acres of the Blackfeet and 8,371 acres of the Cabinet National Forests within the county. Some of the largest saw mills in the state are located at Libby.

Land Values: Prices of land range from $8 to $90 an acre, depending upon character, location, amount of clearing done and its improvements.

Transportation and Highways: The main line of the Great Northern crosses the county east and west and a branch line runs from Rexford to the Fernie coal fields in British Columbia. The Theodore Roosevelt Highway parallels the railroad and serves the northern end of the county. The Park-to-Park Highway enters the county near the southwestern corner and swinging northwesterly, meets the Roosevelt Highway at Libby. The Scenic International Parks Highway, from Salt Lake to Banff and the Canadian National Parks, enters the county from the eastern side and at Eureka swings north to Gateway into Canada.

Education: There are 44 schools, including three high schools, with a total enrollment of 1,702.

Cities and Towns: Libby, the county seat, in the west central part, and Eureka in the northeastern corner, are the largest towns. Troy, with a population of 736, is a division point on the Great Northern. Warland is another of the industrial towns of the county.

Climatological: According to the weather bureau station at Libby, the average temperature is 44.4 degrees and the annual precipitation is 20.70 inches. Observations of 27 years record a frost-free period of 92 days.

Crop Production: The value of all crops in Lincoln county in 1927 totaled $410,095, divided as follows: Spring wheat 3,000 acres, acre yield 23, production 69,000 bushels, value $66,930; oats 2,000 acres, acre yield 45, production 90,000, value $39,600; barley 1,000 acres, acre yield 37, production 37,000 bushels, value $22,200; rye 500 acres, acre yield 17, production 8,500 bushels, value $6,205; potatoes 300 acres, acre yield 130, production 39,000 bushels, value $25,350; all tame hay 12,000 acres, acre yield 2.3, production 27,600 tons, value $231,840; wild hay 1,300 acres, acre yield 1.25, production 1,600 tons, value $12,000; apples 900 bushels, value $1,170; truck crops and vegetables $3,700; miscellaneous fruits $1,100.

Livestock: Livestock products marketed in 1927 totaled $249,000. Combined crops and livestock were $659,095.

Value of Industries: The estimated value of manufacturing in 1927 was $3,659,000. Value of metal mining totaled $80,000, lumbering $734,700 (includes value of lumber cut only; Value added by manufacture not included); and tourist $215,000.

Total and Per Capita Production: The total production for the county is valued at $5,347,795 and per capita production for 1927 at $647.

The county extension agent is located at Eureka.

Lincoln county's assessed value in 1927 was $18,627,153, with real estate assessed at $8,896,000, livestock at $135,000 and public utilities at $6,981,000. The taxable value of all property was $6,280,942. The county tax rate was 21.75 mills on the taxable valuation and the average school levy was 29.23 mills. The average tax for all purposes on farm and grazing land was 9.4 cents an acre; on horses, 61.4 cents a head; on cattle, 64.3 cents a head, and on sheep 19 cents.

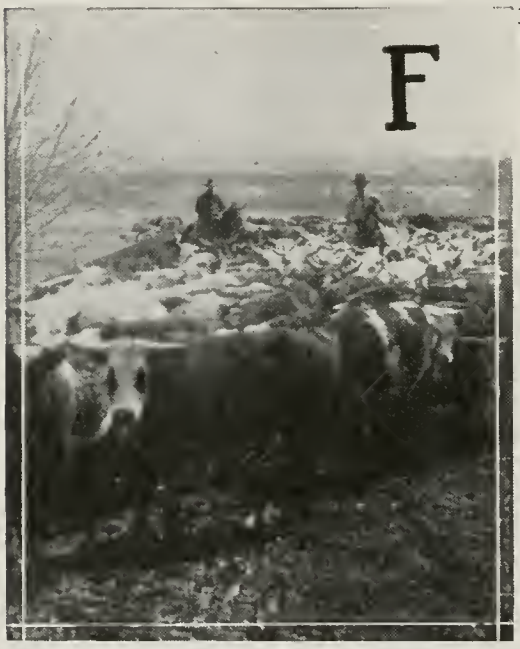
The net indebtedness of the county June 30, 1924, amounted to $243,591.27 June 30, 1927, it was $183,004 54, a reduction of 23.64 per cent in three years. The net indebtedness of district schools June 30, 1927, was $147,063.34, and the per capita net debt for county and school purposes was $42.72.

Additional Information: For more detailed information regarding the resources of Lincoln county, write to the Tobacco Valley Commercial Club at Eureka, or the Commercial Club at Libby, Montana.

FLATHEAD COUNTY

Date of Creation.....Feb. 6, 1893	Est. County Population Jan. 1, 1928...18,533
Land Area.....5,294 square miles	Population 1920.....17,747
County Seat.....Kalispell	Population County Seat.....5,615
Altitude of County Seat.....2,959 feet	Growing Season.....April 15 to Sept. 1

By Charles C. Baldwin.



FLATHEAD COUNTY is composed principally of the valleys of the Flathead River and its tributaries and has within its boundaries several large, well known and very beautiful lakes—Flathead, Whitefish and McDonald. The county is about 60 miles long, north and south, and will average about 60 miles in width. The main range of the Rocky Mountains border it on the east; lesser ranges are within the county. Glacier Park occupies 577 square miles of northeastern Flathead county.

Surface and Soil: The level valleys are fine farm land, with a clay subsoil, some localities being sandy. Very little rock is found except in the mountains.

Crops: All kinds of grain, forage crops, potatoes, vegetables, and small fruits yield heavy crops. In fruit raising, Flathead is second in importance, apples, pears, cherries, plums and berries being profitable crops. The sweet cherry is rapidly gaining prominence in this section. Conditions have been found to be ideal in the northern end of the valley for the growing of celery, French endive and Bermuda onions.

Drainage and Water Supply: Splendid drainage and numerous creeks provide irrigation for thousands of acres. In addition to the 10,000 developed horsepower, at Big Fork, it is estimated that nearly 200,000 additional horsepower can be developed in the South Fork of the Flathead River. Drinking water is supplied from pure mountain streams.

Industries: Lumbering, box-making, farming, stock raising and dairying are the principal industries. Ideal conditions exist for manufacturing, there being a fine opening for a pulp and paper mill, with millions of board feet of white spruce and other varieties of timber easily available.

Mineral Resources: There are heavy coal deposits in the northeastern corner. The existence of copper and other minerals is reported. Pottery clay, also brick and fire clay deposits are found.

Timber: Timber is the county's biggest natural resource. There are thousands of acres within the national forests.

Land Values: Cut-over timber land, $5 to $30 per acre, and cleared land, $50 to $150 per acre.

Transportation and Highways: The main line of the Great Northern crosses the county east and west and a branch runs southwesterly from Columbia Falls to Somers, which is the head of navigation on Flathead Lake. Steamboats operate between Somers and Polson at the southern end, which is a terminus of a branch of the Northern Pacific. The Roosevelt Highway (Federal No. 2) crosses the county, east and west, and the Scenic International Parks Highway (Federal No. 93) runs north and south across the county and connects Yellowstone and Glacier National Parks. Scenically, this is one of the most attractive regions in the United States.

Education: Accredited high schools at Kalispell, Whitefish, Columbia Falls and Somers. All schools in the county are graded and of a high standard. Total number of schools in county is sixty, with a total enrollment of 4388.

Cities and Towns: Kalispell, the county seat, and Whitefish are the largest towns and chief trading points. Both are modern little cities and ideally located. Other towns are Columbia Falls, Somers, Big Fork, Belton, Apgar, Coram, Creston, Essex, Kila, Lake Five, Marion, Lupfer, Mock, Nyack and Olney.

Climatological: Severe storms are practically unknown. Average annual temperature about 42 degrees. Average annual rainfall about 17 inches. Average annual wind velocity 4.8 miles per hour. Average length of growing season about 148 days.

Crop Production: Flathead county led the state in potato production in 1927. The total value of all crops was $1,755,315, divided as follows: Spring wheat 26,000 acres, acre yield 21, production 546,000 bushels, value $529,620; winter wheat 10,000 acres, acre yield 27, production 270,000 bushels, value $248,400; all wheat 36,000 acres, acre yield 22.7, production 816,000 bu., value $778,020; oats 8,000 acres, acre yield 40, production 320,000 bushels, value $140,800; barley 10,000 acres, acre yield 33, production 330,000 bushels, value $198,000; rye 500 acres, acre yield 18, production 9,000 bushels, value $6,570; corn 1,000 acres, acre yield 25, production 25,000 bushels, value $18,000; corn 3,200 acres, acre yield 140, production 448,000 bushels, value $291,200; seed peas 200 acres, acre yield 20, production 4,000 bushels, value $8,400; alfalfa seed 300 acres, acre yield .83, production 250 bushels, value $3,250; clover seed 200 acres, acre yield 1.25, production 250 bushels, value $3,750; all tame hay 12,000 acres, acre yield 2, production 24,000 tons, value $201,600; wild hay 7,000 acres, acre yield 1.25, production 8,800 tons, value $66,000; apples 6,250 bushels, value $8,125; truck crops and vegetables, value $29,400; miscellaneous fruits, $2,200.

Livestock: Value of livestock products marketed totaled $634,500. Combined crops and livestock were $2,389,815.

Value of Industries: The estimated value of manufacturing is $3,610,000; lumbering $1,103,475 (includes value of lumber cut only. Value added by manufacturing is not included); and tourist $260,000.

Total and Per Capita Production. The total production for the county is valued at $7,363,290 and per capita production for 1927 at $397.

Flathead real estate, with improvements, was assessed in 1927 at $25,955,460, livestock at $583,085 and public utilities at $7,320,129. The total value of all property was $41,008,874, with a taxable value of $12,877,586. The county tax rate was 20.67 mills on the taxable valuation, and the average rate for school purposes was 24.74 mills. The general tax for all purposes averaged 28.2 cents an acre on farm and grazing lands, 70.9 cents a head on horses, 62.7 cents a head on cattle and 13.3 cents a head on sheep.

During the three-year period, June 30, 1924-1927, the net county indebtedness was reduced from $848,701.45 to $675,164.70. This is a reduction of $173,536.75, or more than 20 per cent.

District schools during the same period accomplished a reduction of nearly 36 per cent. This net debt amounted to only $80,043.06 June 30, 1927, as compared with $124,588.42 June 30, 1924. The per capita net debt for county and school purposes is $42.55, well below the average for the state.

Additional Information: For more detailed information about the resources or recreational advantages of Flathead county, write to the Kalispell Chamber of Commerce or the Whitefish Chamber of Commerce.

SANDERS COUNTY

Date of Creation	March 1, 1906	Est. County Population Jan. 1, 1928	4,731
Land Area	2,840 square miles	County Population 1920	3.949
County Seat	Thompson Falls	Population County Seat	308
Altitude County Seat	2,462 feet	Growing Season	111-132 days

By F. J. Kershisnik,

ALTHOUGH small in area, Sanders county located in west central Montana, possesses important lumber and mining resources and holds vast possibilities in agriculture which are fast being developed. The crest of the Coeur d'Alene defines its eastern boundary while the Idaho line marks the west boundary.

Surface and Soil: Much of the surface is mountainous but many sections are flat and fertile enough for agricultural purposes. These sections are as much as 30 square miles in extent. There is good agricultural land available along all of the numerous small streams and all along the Clark's Fork of the Columbia River there are large areas fitted for farming. Much of the soil is deep sandy loam and ranges to a white clay.

Crops: Wheat has been the principal crop in Sanders county but has to a great extent been replaced by barley, oats, corn and rye. Vegetables, potatoes and other root crops are raised and are especially adapted. Hay has been an important crop and in late years the clover and alfalfa seed industry has been climbing to the first rank.

Livestock: Livestock raising has for some time been an important industry in the county and is constantly growing. Sheep, cattle, hog and poultry raising are important in this field.

Dairying has long been accepted as an important phase of the agriculture of the county and is constantly on the increase as new lands are developed.

Industries: Possessing enormous timber resources, lumbering is and will continue to be closely allied with agricultural industries. The annual cut averages about eight and one-half million feet. This is manufactured into lumber, ties, mine timbers, poles and other lumber products. The number and output of operating mills is controlled largely by the value of timber products. Therefore, substantial increase in the lumber industry will be noticeable, depending upon changing economic conditions and market values.

Timber: Sanders county is endowed with a vast forested area—approximately one and one-fourth million acres—which supports something over three billion feet of commercially valuable species of timber, a large portion of which consists of excellent stands of western yellow pine, that attains a quality unsurpassed anywhere. Extremely fine and extensive stands of western white pine, western larch and associated species of valuable trees are found in these virgin forests.

Drainage and Water Supply: The Clark's Fork of the Columbia which flows the full length of the county, is fed by numerous tributaries rising in the Coeur d'Alene and Cabinet mountains.

Mineral Resources: Mining is a promising industry in the county and particularly in the west end. Little has been done beyond the prospective stage, but gold, copper and silver-lead ores are mined.

Land Values: Land in the cut-over regions sells at $8 to $25 per acre, while prices in the prairie sections range as high as $100 per acre. Sanders county offers all kinds of conditions for farming, including irrigated, sub-irrigated, humid and dry conditions. There is also an abundance of open and forest range.

Transportation: The main line of the Northern Pacific follows the Clark's Fork of the Columbia a distance of 125 miles across the county. The National Parks Highway also parallels these.

Education: There are 33 schools in the county including three four-year high schools, three three-year high schools, one two-year high school and 26 grade schools. These schools employ 77 teachers and the attendance totals 1,250.

Cities: Thompson Falls is the county seat. Plains, Hot Springs, Dixon and Perma are important community centers and shipping points. Heron, Noxon, Tuscor, Trout Creek, Alger, White Pine and Belknap are nice communities in the agricultural sections of the logged-off area.

Climatological: According to the weather bureau station at Thompson Falls, the average annual temperature of the county is 44.7 degrees and the normal average precipitation is 20.35 inches. The station at Trout Creek records an annual precipitation of 28.40 inches. An observation of 13 years records a frost-free period of 125 days.

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Crop Production: The value of all crops in Sanders county in 1927 totaled $564,712, divided as follows: Spring wheat 3,000 acres, acre yield 24, production 72,000 bushels, value $69,840; winter wheat 1,000 acres, acre yield 23, production 23,000 bushels, value $21,160; all wheat 4,000 acres, acre yield 23.7, production 95,000 bushels, value $91,000; oats 2,000 acres, acre yield 46, production 92,000 bushels, value $40,480; barley 2,200 acres, acre yield 37, production 81,400, value $48,840; rye 300 acres, acre yield 17, production 5,100 bushels, value $3,722; corn 1,000 acres, acre yield 25, production 25,000 bushels, value $18,000; potatoes 600 acres, acre yield 130, production 78,000 bushels, value $50,700; alfalfa seed 200 acres, acre yield 2.8, production 560 bushels, value $7,280; all tame hay 15,000 acres, acre yield 2.2, production 33,000 tons, value $277,200; wild hay 1,300 acres, acre yield 1.15, production 1,500 tons, value $11,250; apples, production 7,800 bushels, value $10,140; truck crops and vegetables, $5,000, and miscellaneous fruits $1,100.

Livestock: Livestock products marketed in 1927 totaled $998,500. Combined crops and livestock were $1,563,212.

Value of Industries: The estimated value of manufacturing was $538,000; the value of metal mining $10,000, lumbering $291,555 (includes value of lumber cut only. Value added by manufacturing not included); and tourist $195,000.

Total and Per Capita Production: The total production for the county is valued at $2,597,767 and per capita production for 1927 at $549.

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Real estate improvements were assessed in 1927 at $9,299,677, and livestock at $510,944. Public utility allocations by the state board of equalization totaled $7,741,168, and personal property other than livestock was valued at $3,294,670. The total value of all property was $20,846,459, with a taxable value of $7,013,157.

The county tax rate of 23 mills on taxable valuations last year, and the school rate of 24.52 mills, are both close to the state average. Taxes for all general purposes averaged 10.6 cents an acre on farm and grazing lands, 61.3 cents a head on horses, 64.1 cents a head on cattle and 14 cents a head on sheep.

Net indebtedness of the county June 30, 1924, amounted to $238,738.84. June 30, 1927, it was $198,581.40, a reduction of nearly 20 per cent. School districts, during the same three-year period, reduced the total of their net indebtedness from $189,210.15 to $168,-400.32, about 11 per cent. The per capita net debt for county and school purposes was $91.66 June 30, 1927.

Additional Information: For more detailed information regarding the resources of Sanders county write to the County Agent, Thompson Falls, Montana.

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COLOR PLATES

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